1994

A comparison of secondary and postsecondary school teachers' and administrators' attitudes toward tech-prep programs

Liang-Chih Huang
Iowa State University

3

94

24226

Order Number 9424226

A comparison of secondary and postsecondary school teachers' and administrators' attitudes toward tech-prep programs

Huang, Liang-Chih, Ph.D.

Iowa State University, 1994

U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

A comparison of secondary and postsecondary school teachers' and administrators' attitudes toward tech-prep programs

by

Liang-Chih Huang

A Dissertation Submitted to the

Graduate Faculty in Partial Fulfillment of the

Requirements for the Degree of

DOCTOR OF PHILOSOPHY

Department: Industrial Education and Technology
Major: Industrial Education and Technology

Approved:

Signature was redacted for privacy.

In Charge of Major Work

Signature was redacted for privacy.

For the Major Department

Signature was redacted for privacy.

For the Graduate College

Iowa State University
Ames, Iowa

1994

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I. INTRODUCTION

Background for the Study

The twentieth century has been an era of knowledge exploration and rapid technological changes. In order to remain competitive in the global marketplace and meet the rapid changes of society, America's workers need to meet higher standards of achievement. Therefore, a new initiative, called the tech-prep program was designed for use in secondary and postsecondary schools to offer and promote the idea that students need to continue to study and obtain the basic entry skills of workplaces.

There has always been a positive relationship between the education of America's citizenry and economic competitiveness with foreign nations (Colelli, 1993). According to the U.S. Department of Labor report (1991) from the Secretary's Commission on Achieving Necessary Skills (SCANS), large numbers of individuals are graduating from America's high schools without the basic foundation skills and generic work-related competencies required for either direct entry into a meaningful job or continued education at the postsecondary level. As a result, it seems necessary for educators to develop a new systematic, technological approach for the educational system to prepare students who have basic skills and knowledge to meet the rapidly growing needs for skilled labor. There is a growing tide of opinion that U.S. citizens must be better educated at the secondary level in both academic foundation and generic career related competencies.

Colelli (1993) mentioned:

> Many feel that this type of basic education is essential to better prepare individuals for the type of technology-based college level education required to

> develop a world-class workforce. Therefore, a new initiative in education is currently receiving considerable attention across the United States. This initiative, called tech-prep program, is designed to provide a focus for the majority of students who meander through the general high school curriculum with few career goals or ambitions. These students have traditionally been the least prepared either for immediate entry into the world of work or for continued education at the postsecondary level. (pp. 2-3)

The first major attempt to establish a tech-prep program was the result of federal manpower legislation (e.g., The Manpower Development and Training Act of 1962, and the Vocational Education Act of 1963). The second attempt to a establish tech-prep program came in response to the Education Amendments of 1972. The tech-prep programs, mentioned again in the Carl D. Perkins Vocational and Applied Technology Education Act Amendment of 1990, were formulated to provide a means of preparing youth for America's ever changing, globally-competitive workforce (Dornsife & Bragg, 1992). Tech-prep programs should contain technologically-rich and academically-challenging curricula required to rebuild America's workforce (Carl D. Perkins Vocational and Applied Technology Education Act Amendment of 1990). Today's concept of tech-prep programs is envisioned to blend articulation, applied academics, career education, and work-based learning in ways that can offer America's students the opportunity for success in postsecondary education and careers (Dornsife & Bragg, 1992).

The concept of tech-prep program was developed more fully during the 1980s. Federal legislation attempting to improve the quality of America's schools and colleges came about as the result of political debate. Beginning with <u>A Nation at Risk</u> (Commission on Excellence in Education, 1983), the country was alerted to the problems of low achievement and the high drop-out rate in America's schools. However, according to Hanson (1991), it heightened the country's awareness of problems in schools without providing meaningful solutions to them.

In order to counter reforms focused primarily on academic education, the vocational education community produced The Unfinished Agenda (National Commission on Secondary Vocational Education, 1984). It was the strongest statement of nationwide support for an articulated curriculum to prepare youth for employment. Funded by the U.S. Office of Vocational and Adult Education (OVAE), the commission responded to the wake of national reports documenting the deficient academic preparation of students, and the need for school reform (Dornsife & Bragg, 1992).

At the same time, Parnell (1985) offered a potential option for bringing technical education into the mixing bowl of educational reform in the book The Neglected Majority. Parnell argued that a narrow view of excellence had driven America's educational system into a corner and proposed the 2+2 Tech Prep/Associate Degree (TPAD) program. Parnell saw TPAD as a complete restructuring of general education curricula. In essence, it was a way to reach the middle two quartiles of America's secondary school population–the neglected majority–those in neither college preparatory nor vocational education programs. Parnell believed tech-prep would ". . . blend the liberal arts with the practical arts without diluting the time-honored baccalaureate degree/college prep track" (Parnell, 1985, p. 140). According to Parnell, the content of the program should be a foundation of basic proficiency development in math, science, communications, and technology in an applied setting. A substantive program coordination between secondary and postsecondary schools was further recommended. With this framework as a guide, tech-prep initiatives began developing across the country in the late 1980s (Dornsife & Bragg, 1992).

In response to these initiatives, the Southern Regional Education Board (SREB) recommended that state vocational education departments establish standards for integrating math and science competencies into their programs, monitoring outcomes, and reporting progress (Southern Growth Policies Board, 1989). In addition, the Southern Technology Council recommended that high school and community college administrators work together to ensure a smooth transition between educational institutions because the responsibility for teaching higher-order technical occupational skills had shifted to two-year colleges.

In the early implementation of tech-prep programs, the Center for Occupational Research and Development (CORD) played an important role. This center was actively engaged in developing personnel, organizing consortia, and designing applied academic curricula during the mid to later 1980s (Hull & Parnell, 1991). It continues to have a part in the implementation of tech-prep programs in local consortia forming throughout the nation. Without a doubt, CORD'S vision of tech-prep program is having a significant impact on implementation of the current legislation.

As a result of the efforts by these organizations, federal policy makers, educators, and business leaders, many curriculum changes had occurred in secondary and postsecondary institutions by the late 1980s (Dornsife & Bragg, 1992). In particular, over thirty-four state representatives reported the establishment of tech-prep programs between various secondary and postsecondary institutions (Tri-County Technical College, 1990a). A fifty-state survey of tech-prep having federal funds awarded by states for fiscal years 1992 and 1993 showed that, currently, tech-prep programs have been implemented in all fifty U.S. states (Bragg, 1992a).

Through the early implementation of tech-prep, states were beginning to address problems created by disjointed educational programs and facilitating formal articulation agreements between secondary and postsecondary vocational-technical education programs. However, most shared the difficulty with establishing consistent definitions for articulated programs including the tech-prep program, finding adequate funding, and enlisting full-time leadership (Dornsife & Bragg, 1992).

According to Pollard (1990), tech-prep programs are now in the forefront of vocational education with a legislative emphasis focused on development and implementation. Hoerner (1991) exclaimed that the tech-prep program is one of the most exciting concepts in education today and will continue to attract attention in the future. However, the attitudes of teachers and administrators toward tech-prep validity are seen as one of the main factors to successful implementation of tech-prep programs between secondary and postsecondary schools. In order to implement tech-prep programs successfully in secondary and postsecondary schools, it will be necessary to first explore the attitudes of teachers and administrators.

Need for the Study

The tech-prep program is an educational initiative that promotes increased cooperation and communication between local educational agencies and postsecondary institutions for the purpose of improving the quality of instruction and employment potential of students, particularly those enrolled in general or vocational education. It represents a trend in educational reform that employs strategies of articulation and integration between secondary and postsecondary levels of education to improve the credentials, certification, and transition of students into successful employment (Mensel, 1991). The tech-prep program represents a shift away from the traditional job-skills orientation of vocational education toward the broader purpose of using vocational education as a vehicle for learning academics and other kinds of thinking skills, particularly for linking thought with action (Wirt, 1991). Therefore, teachers and administrators are determinants in the successful implementation of innovative educational programs in their schools. Their attitudes and perceptions directly influence the success in implementing tech-prep programs, and their opinions can be regarded as valuable aids to educators involved in the establishment, implementation, and administration of tech-prep programs.

Statement of the Problem

Several problems were addressed in the study. This study sought to compare:

1. The perceived differences in attitudes of tech-prep teachers and administrators toward tech-prep programs in secondary and postsecondary schools;
2. The attitudes of tech-prep teachers toward tech-prep programs in secondary and postsecondary schools;
3. The attitudes of administrators toward tech-prep programs in secondary and postsecondary schools.

4. The attitudes of tech-prep teachers and administrators toward tech-prep programs in secondary schools;
5. The attitudes of tech-prep teachers and administrators toward tech-prep programs in postsecondary schools; and
6. The demographic data (educational level, years of teaching/administrative experience, and number of in-service training) of tech-prep teachers and administrators toward tech-prep programs in secondary and postsecondary schools.

Purpose of the Study

Specifically, the purposes of the study were to determine:

1. The perceived attitudes of secondary and postsecondary school tech-prep teachers and administrators toward the philosophy, administration, curriculum of tech-prep, and their opinion of barriers to implement tech-prep programs; and
2. If there was a difference in the attitudes of secondary and postsecondary school tech-prep teachers and administrators based on different educational levels, years of teaching/ administrative experience, and number of in-service training activities toward philosophy, administration, curriculum, and barriers of implementing tech-prep programs.

Variables of the Study

Independent variables

The independent variables chosen for this study included: (1) school level (secondary, postsecondary school); (2) position title (tech-prep teacher, administrator); (3) educational level (less than bachelor, bachelor, master, master+30, and doctorate); (4) years of teaching/ administrative experience; (5) number of in-service training activities (seminar, workshop, conference, staff meeting, etc., between 1990-1993).

Dependent variables

The dependent variables included: (1) attitudes of the secondary and postsecondary school tech- prep teachers toward tech-prep programs; (2) attitudes of the secondary and postsecondary school administrators toward tech-prep programs.

Questions of the Study

The questions of this study were as follows:

1. Do the attitudes toward tech-prep programs differ between tech-prep teachers and administrators at both secondary and postsecondary schools?
2. Do the attitudes toward tech-prep programs differ between tech-prep teachers at secondary schools and teachers at postsecondary school?
3. Do the attitudes toward tech-prep programs differ between administrators at secondary schools and administrators at postsecondary schools?
4. Do the attitudes toward tech-prep programs differ between tech-prep teachers and administrators at secondary schools?
5. Do the attitudes toward tech-prep programs differ between tech-prep teachers and administrators at postsecondary schools?
6. Are the attitudes of tech-prep teachers toward tech-prep programs influenced by their

educational level, years of teaching/administrative experience, and number of in-service training activities attended?

7. Are the attitudes of administrators toward tech-prep programs influenced by their educational level, years of teaching experience/administrative experience, and number of in-service training activities attended?

Research Hypotheses

Based on the questions of this study, the following research hypotheses were formulated:

Hypothesis 1: The attitudes of administrators toward tech-prep programs will be more positive than those of tech-prep teachers at both secondary and postsecondary schools.

Hypothesis 1.1: Administrators' attitudes toward the curriculum of tech-prep programs will be more positive than those of tech-prep teachers.

Hypothesis 1.2: Administrators' attitudes toward the administration of tech-prep programs will be more positive than those of tech-prep teachers.

Hypothesis 2: The attitudes of administrators in postsecondary schools toward tech-prep programs will be more positive than those in secondary schools.

Hypothesis 2.1: Postsecondary school administrators' attitudes will be more positive than those in secondary schools toward the curriculum of tech-prep programs.

Hypothesis 2.2: Postsecondary school administrators' attitudes will be more positive than those in secondary schools toward the administration of tech-prep programs.

Hypothesis 3: The attitudes of tech-prep teachers in postsecondary schools toward tech-prep programs will be more positive than those in secondary schools.

Hypothesis 3.1: Postsecondary school tech-prep teachers' attitudes will be more positive than those in secondary schools toward the curriculum of tech-prep programs.

Hypothesis 3.2: Postsecondary school tech-prep teachers' attitudes will be more positive than those in secondary schools toward the administration of tech-prep programs.

Hypothesis 4: The attitudes of secondary school administrators toward tech-prep programs will be more positive than those of tech-prep teachers.

Hypothesis 4.1: Administrators' attitudes toward the curriculum of tech-prep programs will be more positive than those of tech-prep teachers in secondary schools.

Hypothesis 4.2: Administrators' attitudes toward the administration of tech-prep programs will be more positive than those of tech-prep teachers in secondary schools.

Hypothesis 5: The attitudes of postsecondary school administrators toward tech-prep programs will be more positive than those of tech-prep teachers.

Hypothesis 5.1: Administrators' attitudes toward the curriculum of tech-prep programs will be more positive than those of tech-prep teachers in postsecondary schools.

Hypothesis 5.2: Administrators' attitudes toward the administration of tech-prep programs will be more positive than those of tech-prep teachers in postsecondary schools.

Hypothesis 6: Tech-prep teachers with higher educational levels, both in secondary and postsecondary schools, will demonstrate more positive attitudes toward tech-prep programs than those with lower educational levels.

Hypothesis 6.1: Tech-prep teachers with higher educational levels will demonstrate more positive attitudes toward the curriculum of tech-prep programs than those with lower educational levels.

Hypothesis 6.2: Tech-prep teachers with higher educational levels will demonstrate more positive attitudes toward the administration of tech-prep programs than those with lower educational levels.

Hypothesis 7: Administrators with higher educational levels, both in secondary and postsecondary schools, will demonstrate more positive attitudes toward tech-prep programs than those with lower educational levels.

Hypothesis 7.1: Administrators with higher educational levels will demonstrate more positive attitudes toward the curriculum of tech-prep programs than those with lower educational levels.

Hypothesis 7.2: Administrators with higher educational levels will demonstrate more positive attitudes toward the administration of tech-prep programs than those with lower educational levels.

Hypothesis 8: Tech-prep teachers who have more years of teaching experience, both in secondary and postsecondary schools, will demonstrate more positive attitudes toward tech-prep programs than those who have fewer years of teaching experience.

Hypothesis 8.1: Tech-prep teachers with more years of teaching experience will demonstrate more positive attitudes toward the curriculum of tech-prep programs than those with fewer years of teaching experience.

Hypothesis 8.2: Tech-prep teachers with more years of teaching experience will demonstrate more positive attitudes toward the administration of tech-prep programs than those with fewer years of teaching experience.

Hypothesis 9: Administrators who have more years of administrative experience, both in secondary and postsecondary schools, will demonstrate more positive attitudes toward tech-prep programs than those who have fewer years of administrative experience.

Hypothesis 9.1: Administrators with more years of administrative experience will demonstrate more positive attitudes toward the curriculum of tech-prep programs than those with fewer years of administrative experience.

Hypothesis 9.2: Administrators with more years of administrative experience will demonstrate more positive attitudes toward the administration of tech-prep programs than those with fewer years of administrative experience.

Hypothesis 10: Tech-prep teachers who have a greater number of in-service training activities (between 1990-1993), both in secondary and postsecondary schools, will demonstrate more positive attitudes toward tech-prep programs than those who have a fewer number of in-service training activities.

Hypothesis 10.1: Tech-prep teachers with a greater number of in-service training activities will demonstrate more positive attitudes toward the curriculum of tech-prep programs than those with a fewer number of in-service training activities.

Hypothesis 10.2: Tech-prep teachers with a greater number of in-service training activities will demonstrate more positive attitudes toward the administration of tech-prep programs than those with a fewer number of in-service training activities.

Hypothesis 11: The administrators who have a greater number of in-service training activities (between 1990-1993), both in secondary and postsecondary schools, will demonstrate more positive attitudes toward tech-prep programs than those who have a fewer number of in-service training activities.

Hypothesis 11.1: Administrators with a greater number of in-service training activities will demonstrate more positive attitudes toward the curriculum of tech-prep programs than those with a fewer number of in-service training activities.

Hypothesis 11.2: Administrators with a greater number of in-service training activities will demonstrate more positive attitudes toward the administration of tech-prep programs than those with a fewer number of in-service training activities.

Assumptions of the Study

The following assumptions were made in the design of this study:

1. The portion of the Tech-prep Attitude Scale (Pollard, 1990) used to measure faculty attitude was valid and reliable.
2. Attitudes toward tech-prep programs can be measured by the attitude scale developed for the study.
3. Secondary and postsecondary school teachers and administrators are important factors in the implementation of tech-prep programs.

4. Secondary and postsecondary school teachers and administrators are knowledgeable toward tech-prep programs.
5. The respondents answered the survey questions accurately and honestly.
6. The collected data reflected the actual experiences of tech-prep teachers and administrators toward tech-prep programs in secondary and postsecondary schools.

Limitations of the Study

Tech-prep programs evolved from articulated education programs such as: '2+2, 2+2+2, and 4+2'. Parnell (1985) proposed the '2+2' Tech Prep/Associate Degree (TPAD) program in the book, The Neglected Majority. This study was limited to tech-prep programs selected from secondary and postsecondary schools having strong tech-prep programs. These schools were recommended from ten selected states based on the amount of federal funding in the fiscal years 1992 and 1993 (Bragg, 1992a) and have implemented tech-prep programs in the United States for at least two years.

Definition of Terms in the Study

Administrative Issues The development and implementation of tech-prep programs from a administrative viewpoint. Included in this category are financial, enrollment, facility, and barrier concerns (Pollard, 1990).

Articulation The coordination of educational systems, and the development of curriculum that prevents duplication of course work and offers secondary students advanced placement or advanced skill competence. The process for coordinating different level/systems of education. The purpose of educational articulation is to make a smooth transition from one level/system to another without experiencing delays, duplication of effort or loss of credit (Illinois State Board of Education, 1980).

Articulation Agreement A commitment to a program designed to provide students with a nonduplicative sequence of progressive achievement leading to competencies in a tech-prep education program (American Vocational Association, 1990).

At Risk Students who have dropped out of school or dropped out and reentered, minority students, students whose primary language is other than English, handicapped students, and disadvantaged students (Hoerner et al., 1992).

Attitude Enduring clusters of feelings, beliefs, and behavior tendencies directed toward specific persons, groups, ideas, or objects (Baron, 1983).

Curriculum Issues The development and implementation of tech-prep programs as a course of study (Pollard, 1990).

Philosophy Issues The beliefs about the objectives, affects, and outcomes of tech-prep programs (Pollard, 1990).

Postsecondary Institutions Public and private educational institutions designed to serve students who have completed secondary school. These institutions may include community and technical college, postsecondary technical institutes, postsecondary vocational centers, proprietary schools, and institutions offering apprenticeship programs of at least two years beyond secondary school (Hoerner et al., 1992).

Tech-prep The term 'tech-prep education program' means a combined secondary and postsecondary program which–

a. leads to an associate degree or 2-year certificate;
b. provides technical preparation in at least one field of engineering technology, applied science, mechanical, industrial, practical arts or trade, agriculture, health, or business;
c. builds student competence in mathematics, sciences, and communications (including through applied academics) through a sequential course of study; and
d. leads to placement in employment. (American Vocational Association, 1990, p. 29)

CHAPTER II. LITERATURE REVIEW

Introduction

This chapter presents a review of the literature related to the development and implementation of tech-prep programs. Three sections are included. The first section describes the historical movement of tech-prep programs. The second section presents the current planning and implementation of tech-prep programs. The last section explores the attitudes toward the implementation of tech-prep programs.

The Historical Movement of Tech-Prep Programs

The origin of tech-prep programs is associated with a long history of educators and policy makers confronting two re-occurring debates and related issues. The debates pertain to answering the following questions:

1. What is the appropriate role and function of job training and vocational education as part of the nation's public education system?
2. What are the educational consequences of technological change in the workplace? (Dornsife & Bragg, 1992, p. 2-2)

One view is that technology does indeed increase skill demands and that schools should respond by increasing the availability of highly specialized technical job skill training. An alternative view is that the deskilling effects of technology require greater attention to be paid to the development of broadly applicable basic and higher-order skills. Some may view the tech-prep program as an approach that bridges these alternative views by ensuring technical along with academic, foundational competencies (Dornsife & Bragg, 1992).

Initial development of tech-prep programs

The abundant federal manpower legislation, such as the Manpower Development and Training Act of 1962 and the Vocational Education Act of 1963, demonstrated the first major attempt to establish tech-prep programs. In 1968, the Oregon State Board of Education and State Department of Employment formed two task forces to produce a plan for promoting and directing the development of occupational education in the state's high schools and community colleges. The impetus for the plan was the federal legislation that assigned an increasingly prominent role for vocational education in the achievement of national labor policies. "The legislation also placed an urgent priority on the expansion and refinement of occupational information" (Oregon State Board of Education, 1968, p. 4). Clearly, the seeds for the current tech-prep programs were planted by the efforts of this Oregon task force.

The second attempt to set up tech-prep programs involved the response to the Education Amendments of 1972. This legislation established the 1202 Commission that required states seeking federal assistance to build a commission responsible for comprehensive statewide planning of postsecondary education encompassing community college and occupational education (Dornsife & Bragg, 1992).

In response to the Amendments of 1972, The National Institute of Education (NIE) supported a unified effort to provide a true educational continuum between vocational, technical, and academic education (Bender, 1973). Particularly, NIE advocated the career education concept through the articulation of secondary and postsecondary occupational education programs (e.g., articulation on a nationwide basis). Nevertheless, results from this

NIE study also showed that the relationships of state organizational structures had a significant impact on achieving success. In a nutshell, where vocational education and postsecondary institutions were under the same state organizational structure, the likelihood was greater for articulation to be fostered. Based on the common recognition, there was agreement in establishing educational programs and priorities. However, it would be almost two decades later before federal legislation on tech-prep would provide a framework for building consensus across educational systems through local tech-prep consortia (Dornsife & Bragg, 1992).

During the 1980s, the concept of tech-prep was developed more fully. This was a decade filled with rhetoric, heated political debate, and a plethora of legislation attempting to improve the quality of America's schools and colleges (Dornsife & Bragg, 1992). Beginning with A National at Risk (Commission on Excellence in Education, 1983), the country was alerted to problems of low achievement and high dropout in America's schools. This report kicked off a tidal wave of educational reform and challenged teachers to do more with less.

Therefore, in order to counter reforms primarily on academic education, the vocational education community published The Unfinished Agenda (National Commission on Secondary Vocational Education, 1984). The commission concluded that improved secondary vocational education was based on ". . . building stronger bridges between vocational and academic education to maximize learning and career opportunities for American youth" (1984, p. vi). Commission members argued that more academic course work would not improve the student/employee preparation because ". . . 80 percent of the jobs in America do not require a college degree, and most students will not obtain one" (1984, p. 1). In recognition of these employment characteristics and the need for school reform, the commission proposed curriculum changes in secondary schools that centered on providing theory and application of academic courses, and an explicit meaning for vocational courses. Overall, ". . . vocational education in the integrated secondary curriculum includes career guidance and exploration, general employability skills, and general and specific occupational skill training" (1984, p. 14). In addition, in order to continue their learning in postsecondary institutions, students should be thoroughly aware of career development before entering school.

At that time, Parnell's concept paper (1984) and book, The Neglected Majority (1985), provided a potential national attention for bringing technical education into the mix of educational reform, the concept of a 2+2 Tech-Prep/Associate Degree (TPAD) (Breuder & Martin, 1985; McClure, 1988; Shapiro, 1984). In reviewing the current tech-prep program movement, Parnell's papers were the appropriate starting point to advocate the tech-prep movement. Dale Parnell examined the future employment opportunities in the United States and proposed the development of a four-year structured and closely articulated program of technical preparation to assure that people are trained for those positions.

Feldman (1988) described tech-prep programs as, "The key is a major reshaping of our educational system through strong vocational education extending the high school, especially through our community colleges and postsecondary technical institutions" (p. 4). Shapiro (1984) described the benefits of the 2+2 TPAD programs as ". . . designed to teach students to think analytically, to examine information critically, and to use these skills in life" (p. 90), and cited the 2+2 TPAD programs as ". . . a dramatic model for high school principals wishing to lower dropout rates and to avoid loss of continuity in learning" (p. 94). Parnell (1985) proposed the 2+2 TPAD programs involved a combination of a ". . . common core of learning and technical education that will rest upon a foundation of basic proficiency development in math, science, communications, and technology–all in an applied setting" (pp. 143-144). Furthermore, Parnell recommended real program coordination between secondary and postsecondary schools. With this as a guide, tech-prep initiatives began to develop across the country in the late 1980s.

In agreement with Parnell, Feldman (1988) indicated that although more skilled workers are needed to keep the United States competitive in international economy, half of the young people are being miseducated. Feldman suggested that tech-prep programs serve as a coordinated approach to face the problem by integrating the needs of students, the business community, and the economy. In another case, business and government leaders in twelve southern states formed the Southern Growth Policies Board to address the issues associated with integrating new scientific discoveries and technological innovation with traditional thinking about economic development (Dornsife & Bragg, 1992).

In addition, the Southern Regional Education Board (SREB) recommended establishing standards for integrating math and science competencies into their programs, monitoring outcomes, and reporting progress in state vocational education departments (Southern Growth Policies Board, 1989). The Southern Technology Council further recommended to let high school and community college administrators and teachers work together and ensure a smooth transition. To meet this recommendation, the existing programs were suggested to assess and provide the transition by the council. For example, tech-prep programs in Richmond County, North Carolina, have been conducted.

As to the implementation of tech-prep programs, some states, (e.g., Oregon, Delaware, and Indiana) mandated the use of competency-based vocational education curriculum, and the development of articulated programs between secondary and postsecondary institutions. Other states (e.g., Michigan, North Carolina, California, Washington, and Florida) actively promoted articulation, partnerships with business and industry, and performance-based course work (Dornsife & Bragg, 1992, p. 2-9).

Furthermore, educational reform in the 1980s had been chiefly concerned with improving achievement in academic subjects. Tech-prep has been hailed as a groundbreaking movement. Its blend of rigorous academic and technical study in high school and links to community and technical colleges provide a pathway to many high-tech careers that do not require baccalaureate degrees (Gilli & Gilli, 1994).

Articulation education programs

Tech-prep has been spurred on by the Carl D. Perkins Act Amendments of 1990 which made $125 million available to be distributed to the states for their tech-prep programs (Wilcox, 1991). For tech-prep to succeed in the future, however, states must develop articulation and coloration throughout their educational systems (Coorough, 1992). Therefore, it is a important role for articulation education to implement tech-prep programs.

Historical perspective of articulation It is no surprise that articulation is not a new concept. As early as the 1920s, a 6-4-4 system was established in southern California, with grades 11-14 housed in the newly founded Pasadena Junior College, later to become Pasadena City College (Whitlock, 1978). The Seventh Yearbook of the National Education Association, published in 1929, was entirely devoted to a discussion of articulation among educational institutions at all levels. In 1947, ". . . the need to provide easier transition between high school and college" was underscored in the report of the President's Commission on Higher Education (Opachinch & Linksz, 1974, p. 1).

In the 1950s, with the Advanced Placement (AP) Program and the College Level Examination Program (CLEP), articulated academic programs and credit received national attention (Robertson-Smith, 1990). The AP program aimed at allowing secondary students to take college level foundation courses while still in high school; they received advanced standing once they matriculated to a postsecondary institution. The inclusion of CLEP examinations were intended to allow students or adults to test out of beginning level courses at postsecondary institutions (Long et al., 1986).

In the 1960s, articulation efforts began to lag behind the need. With large numbers of community and technical colleges being established across the nation, equally large numbers of students were faced with the need to transfer into senior colleges or universities to keep their existing credits intact. Unfortunately, few systematic attempts at planning and collaboration were occurring between 2- and 4-year postsecondary institutions, leaving students to negotiate largely as individuals with senior colleges and universities replete with policies, procedures, and functionaries (Roberrtson-Smith, 1990). Although the early focus was on academic programs, vocational-technical programs took up the articulation challenge in the late 1960s (Long et al., 1986). In the area of secondary and postsecondary articulation, New York was achieving initial success in its efforts to articulate selected business and technical programs among high schools and 2-year colleges (Brick, 1967).

During the 1970s, a number of states began to establish statewide policies and procedures for articulation. The State of Florida and Illinois formed agreements and plans for credit transfer. Georgia's Core Curriculum Formula and New Jersey's Full Faith and Credit Policy of 1973 followed those plans. In 1974, Massachusetts established the Commonwealth Transfer Compact while Nevada adopted the University System Articulation Policy. Oklahoma developed its Articulation Plan in 1975.

Indeed, interest and activities in articulation had reached such a level that several national studies of articulation were undertaken. By examining a number of articulated occupational programs, Bushnell (1978a) reported that many educators viewed articulation program as nothing more than enlightened self-interest. Further, Bushnell concluded that state encouragement or even mandates for articulation were not necessarily sufficient for success, but that the best results were ". . . most successfully . . . achieved when institutions cooperated voluntarily because each one saw that it stood to benefit" (p. 20).

By 1990, 10 states had transfer agreements affecting all of higher education, and 30 of the 50 states had some credit transfer policies in place for the major segments of postsecondary education. In the remaining 20 states, numerous individual agreements were in force between or among individual institutions, or segments of higher education (Robertson-Smith, 1990). Evidence of the growing interest was shown by the increasing attention given the concept in several reports and papers (Bottoms, 1984; Curry, 1983; Friedlander, 1980; Galloway & Washburn, 1985; Knight, 1983; Moore, 1983; Parnell, 1984; Woelfer, 1980).

At the dawn of the 1990s, the need for the improved effectiveness and efficiency of education that articulation programs can provide has been more critical than ever. Educational reform from many quarters of economic, technological, and demographic trends were inspiring renewed interest in articulation as a means of increasing program relevance, reducing the numbers of dropouts, preparing students for a lifetime of change, and contributing to economic development in the United States. Many have seen the articulation of the continuum of occupational programs that comprise vocational/technical education as one of the key means of improving the quality of education in the nation.

Definitions of articulation Articulation has been defined in several ways. Articulation places an emphasis on the process or processes of articulated programs (Bushnell et al., 1977; Fedderson & Loch, 1977; Greeson, 1979; Zane, 1973). Articulation is defined in terms of the goal (Bushnell, 1978b; Farah, 1978; Heuchert & Postlewaite, 1975; Schlieman, 1976). Articulation is addressed as both the process and the goal/objective(s) (Bender, 1973; Blanchard, 1972; Burger & Lambrecht, 1974; Canup, 1975; Farah, 1978; Opachinch & Linksz, 1974; Oregon State Board of Education, 1968; Project MAVE, 1978; Spanbauer, 1977; Woelfer, 1978). Moreover, articulation may be defined as the result of policies and procedures that provide (McCormick, 1980).

Another supporting definition of articulation has been stated by Cone and Hardy (1979) as a process, as attitude, and a goal:

> As a process, articulation is coordination of policies and practices among sectors of the education system to produce a smooth flow of students from one sector to another. As an attitude, it is willingness of educators in all sectors to work together to transcend the individual and institutional self-interest that impedes maximum development of the student. As a goal, it is the creation of an educational system without artificial divisions, so that the whole educational period becomes one unbroken flow, which varies in speed for each individual, and which eliminates loss of credit, delays and unnecessary duplication of effort. (pp. 337-343)

An analysis of the literature of international education dealing with articulation reveals the term is defined to mean compatibility (Bender, 1973). Postsecondary education in England is divided into two separate sectors developing independently of each other, prompting the call for a ". . . search for compatibility between transfer and terminal courses" (Organization for Economic Cooperation and Development, 1971, p. 23). Venn (1964) spoke of articulation as provision for an integral continuity among occupational and general education.

Also, the Illinois State Board of Education (1980) stated the definition of articulation as follows:

> Articulation is the coordination of educational systems, and the development of curriculum that prevents duplication of course work and offers secondary students advanced placement or advanced skill competence. The process for coordinating different level/systems of education. The purpose of educational articulation is to make a smooth transition from one level/system to another without experiencing delays, duplication of effort or loss of credit.

Linked to competency-based education, articulation is seen as a means of increasing the effectiveness and accountability of vocational-technical programs while reducing costs and duplication of effort (Hull, 1984). The definition of articulation by the Illinois State Board of Education (1980) was used in the present study.

Types of articulation Several articulation models have been introduced. In Avenues of Articulation, Long et al. (1986) identified two major models in a national survey of vocational-technical articulation: time-shortened programs and advanced skills programs. Both the time-shortened programs and the advanced skills programs were called vertical articulation, which help students move up from the secondary to the postsecondary level in an educational program.

The time-shortened model is the most common type of articulation. Students can receive advanced placement credit for specific college technical courses and subsequently require less time to complete their current educational program of degree. The students can save some tuition money and complete the postsecondary part of the program faster; however, their skill levels do not advance beyond those of a traditional program (Long et al., 1986). Like time-shortened programs, the advanced skills model was carefully designed to eliminate duplication of program content; however, advanced skills programs use the time saved through integrating the curricular to provide students with more advanced occupational knowledge and skills rather than to permit them to enter the workplace sooner.

In some ways, some models differ in advanced skills programs, such as the core curriculum model and the vocational technical '2+2' model. The main purpose of the core curriculum (called pre-tech) programs is to produce better-prepared high school graduates for entry into postsecondary technical training programs. This model focuses on improving high school students' preparation for college and/or work by providing them with (1) stronger, applied academics; (2) basic technological literacy; and (3) focused but limited learning in some marketable work skills. This model not only applies to vocational students, but it is also used to improve or replace the general education curriculum for non-vocational, non-college-bound students in a regular high school (Norton & Faddis, 1992).

The most well-known core curriculum model is one based on the special applied high school academic courses, e.g., Principles of Technology, developed by the Center for Occupational Research and Development (CORD). Many vocational schools have adopted CORD's courses as a way of strengthening their academic programs; however, several traditional high schools also use one or more of the courses for general education students. Another more comprehensive version of the core curriculum model is Ohio's Model for Technology Education (Savage, 1989). However, this vocational technical '2+2' model focuses strongly on developing advanced skills for high-technology occupations. As Bottoms (1984) explained:

> Advanced-level technical and skilled workers need a broad base of knowledge that can not be developed in two years at either the secondary or postsecondary level. A four-year program is needed to develop their ability to learn in the specific occupational field, and to link this education closely with planned experiences in the employment setting. (pp. 8-9)

Therefore, vocational technical '2+2' programs must blend the resources of both the secondary and postsecondary institutions.

The prior articulation models have employed a form of vertical articulation. Another form of articulation is horizontal. Overall, horizontal articulation generally refers to student transfer of credit from one program to another within an institution or from one institution to another at the same level, whereas vertical articulation refers to the transfer of credit from a lower-level institution to a higher-level one. Tech-prep program belongs to the vertical articulation program.

Essential practices and efforts in articulation Regardless of which model an articulation effort follows, all of the programs studied had certain essential and common characteristics. Doty (1985) reviewed related articulation literature and identified seven essential principles for establishing successful programs:

1. The state administrations should support word, action, and funding.
2. The instructors at both secondary and postsecondary institutions must be involved in the decision making process initially.
3. The persons, e.g., instructors involved in the articulation process should be given credit for work load and/or compensation.
4. Provision of time and compensation must be made for technical upgrading of instructors. Instructors can not be expected to pay for the upgrading.
5. A joint advisory committee should be established to provide communication between institutions and provide recommendations on curriculum.
6. Articulation contracts must be written that specify exact responsibilities of the parties involved. The contracts should be reviewed annually.
7. An atmosphere of "good faith" must prevail throughout the articulation process. (p.7)

Long et al. (1986) compiled and listed a guide of ten principles for articulation success, published by the National Center for Research in Vocational Education (NCRVE), for the main areas of developing and implementing articulation programs:

1. Leadership and commitment from the top;

2. Early faculty involvement;
3. Relationships based on mutual respect and trust;
4. Mutual benefits to all partners;
5. Written articulation agreements;
6. Open clear and frequent communications;
7. Modest initial goals;
8. Clearly define responsibilities;
9. Competency-based curricula; and
10. Common focus on mutual goals rather than individual turf. (pp. 31-38)

With the exception of related principles and processes, it is necessary to form committees responsible for developing specific portions of articulation plan. There are five committees (leadership, procedural, advisory, curriculum development, and evaluation) being used in establishing articulation in Oklahoma City, Oklahoma (Isch, 1984). In addition, the Virginia Peninsula model (Cummings, 1984) provides a coordinated student services for students in articulated competency-based curriculum and curriculum procedure for vocational programs as presented in Figures 2.1 and 2.2.

McClure (1988, p. 6) conducted a project which identified the benefits of articulation for four-year institutions and employers. Ingram and Troyer (1989) compiled information concerning trends and efforts toward improving articulation in the 1980's. They described the results of articulation systems that were in place in 1980's as well as the benefits of those programs.

As to barriers of articulation efforts, Steele (1981) conducted a study used by secondary and postsecondary trades and industry teachers and identified barriers which included disagreements about resources, communication, and curriculum factors. All the participants agreed that the attitude factor was important to the improvement of articulation.

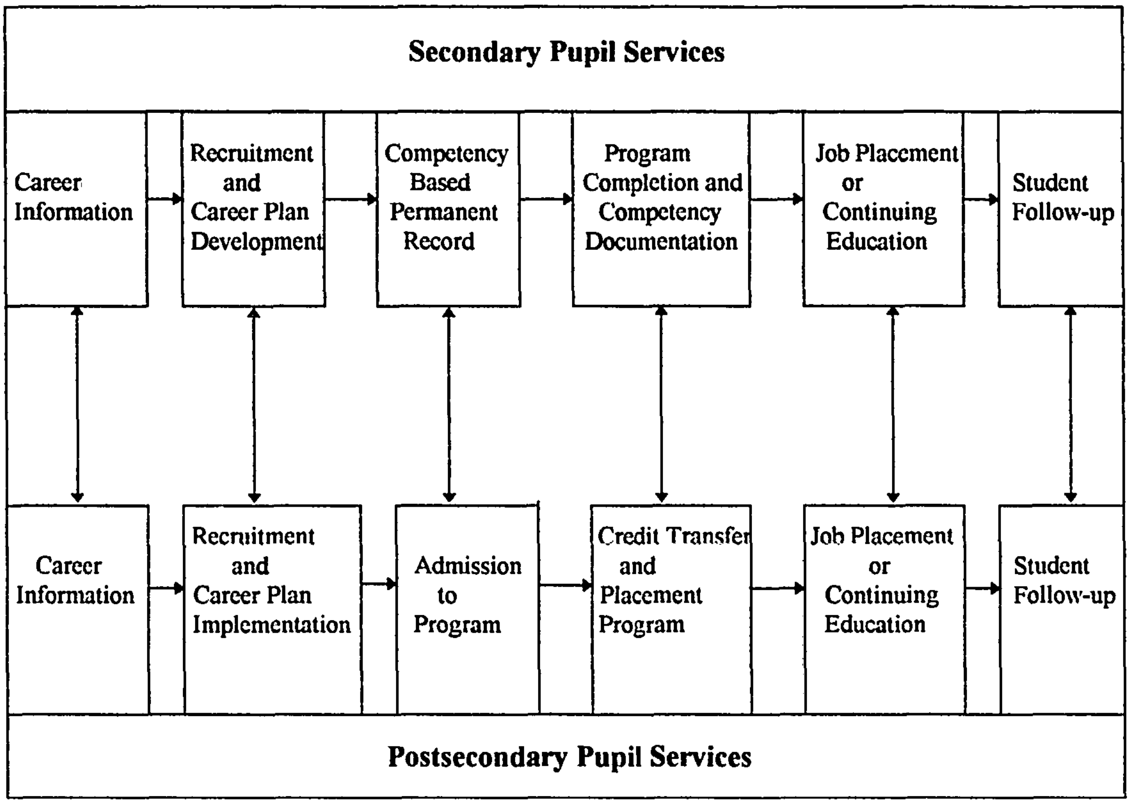


Fig. 2.1. Coordinated student services for students in articulated vocational programs

They suggested improving articulation focused on making postsecondary programs more flexible.

Moore (1983) conducted a survey of secondary and postsecondary directors of occupational education programs in New York State. The barriers identified in this survey included admission policies and procedures, lack of resources, lack of communication, etc. The issues of 'turfism' were of great concern. Meanwhile, other benefiting factors identified in this study included: the use of joint advisory councils; improvement of counseling services;

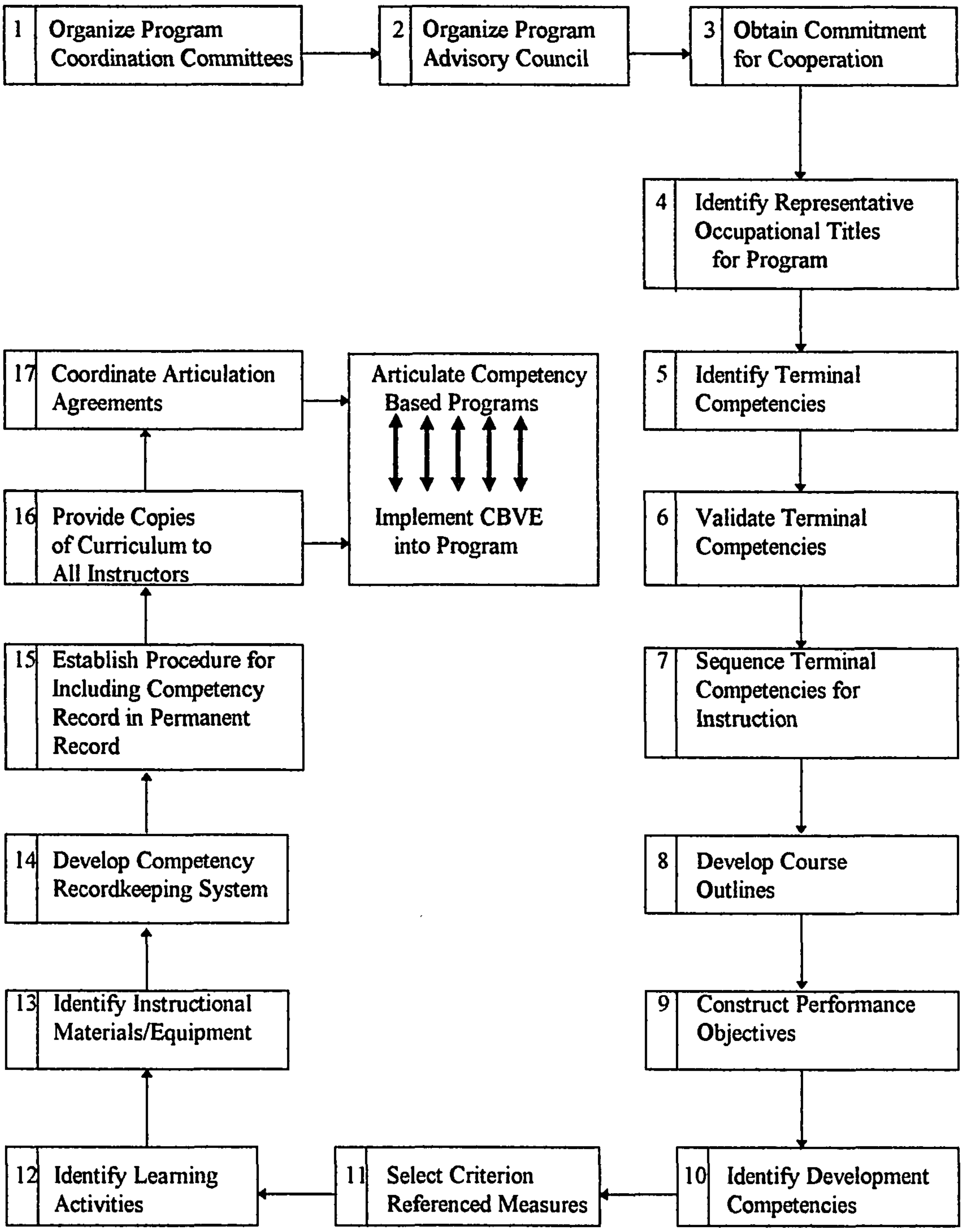


Fig. 2.2. Curriculum coordination procedure chart of Virginia (PAVE articulation model)

career advisement centers and modules/courses provided in career life exploration; faculty exchanges between engaging schools; attendance at in-service workshops and conferences; facilities sharing; joint program evaluation; and close cooperation with business and industry to convince employment needs.

Farland and Anderson (1988) conducted a high school articulation study in California. The identified barriers to articulation were: lack of student awareness of articulation programs; the need for a process or structure of articulation; the need to produce written articulation agreements; and lack of funding and available resources. Ingram and Troyer (1989) also indicated barriers in articulation. Turfism was cited as the most important barrier to articulation. The reason for turfism was the lack of information and experience with articulation. To eliminate these misunderstandings, open communication, trust, and cooperation were suggested.

Educational institutions have been practicing articulation in various forms for at least 30 years. In the 1980s, educators began to use the term 2+2–originally developed to describe transfer linkages between 2-year and 4-year colleges–as a blanket term for nearly anything resembling curriculum coordination or collaboration across educational levels (Norton & Faddis, 1992). According to Parnell (1985), the existing high school tracks for the middle 50-60 percent of American high school students who are not college bound are not appropriate for preparing young people to take their places as the workers of tomorrow. Parnell (1986) noted particularly that:

> The academic and vocational desert of American education . . . is the high school general education program. Too many people are receiving an unfocused general education which relates to nothing, leads to nothing, and

> prepares for nothing. It certainly does little to promote continuity in learning or to build personal confidence and self-esteem. (p. 16)

In an effort to remedy the situation described by Parnell, school officials have placed increased emphasis on articulation programs. Articulation programs are believed to enhance student retention and promote student identification of career goals. They serve to link the final two years of high school with postsecondary technical-education programs.

Many articulation efforts have been initiated. For instance, Long et al. (1986) found that about 30 percent of the nation's 2-year colleges have developed articulation agreements with their constituent secondary institutions. Bushnell (1978a) described the secondary and postsecondary program articulation as a planned process linking two or more educational systems within a community to help students make a smooth transition from one level of instruction to another, without experiencing delay or loss of credit.

Current articulation efforts have examined at least one common characteristic to eliminate, as much as possible, unnecessary duplication of training across the secondary and postsecondary levels (Long et al., 1986). Some early studies of articulation initiatives focused mainly on the effective processes used in planning and implementation, not on the outcomes of the programs. Therefore, understanding what made these processes work or fail was seen as crucial as local consortia moved forward to implement tech-prep programs.

Arnold (1987) suggested that institutions should review what type and how much articulation is needed before developing articulation programs. Arnold noted that articulation planning and implementation has an affect on three areas: administrative roles and relationships, curriculum design, and faculty and staff. Joint planning activities between secondary and postsecondary schools were suggested to be beneficial to both parties. To successfully implement a program, personnel from institutions must provide opportunities of communication, work towards common goals, and eliminate turfism. Arnold concluded that despite many barriers in articulation, the benefits of articulation programs would overcome the problems.

Current Status for Implementation of Tech-Prep Programs

Strong tech-prep programs make a powerful contribution to building student competencies in vocational-technical areas and academic fields. Through the collaborative efforts of secondary and postsecondary institutions, these programs smooth the transition from school to work by providing students with high quality workplace skills (NCRVE, 1992a, p. i).

Tech-prep planners in Illinois have developed firm ideas about tech-prep. Bragg (1991) indicated these ideas as follows:

- An Avenue to educational reform;
- The integration of technical and academic curriculum;
- A secondary and postsecondary articulated curriculum;
- An avenue to an associate of applied science degree and possible more advanced education;
- Partnerships between all levels of education and business/industry; and
- Preparation for employment, careers, and continuing education. (p. 3)

According to the Wisconsin Department of Public Instruction (NCRVE, 1992a), tech-prep is a multifaceted educational restructuring initiative designed to maximize career options for all students in a technological world. Options provided to each student will ensure access to employment and continuing education while emphasizing an open-entry/open-exit delivery system. This initiative is designed to motivate students by making learning relevant. The content is presented in a competency-based, sequential, coherent, integrated curricula model. Each tech-prep option for students consists of a sequence of school- and community-based learning experiences. This initiative is further characterized by flexibility to accommodate new and emerging content. Content must be articulated with postsecondary educational and training opportunities to facilitate student transition to employment and continuing learning.

There appears to be three key factors in the development of the tech-prep initiative: (a) many jobs require more than a high school education and between now and the year 2000, a majority of all new jobs will require postsecondary education; (b) the nationwide increase in the dropout rate from 1977 onwards; and (c) the general education track is not meeting the needs of students (Grant & Eden, 1982; Johnson & Packer, 1987; Roberts & Clark, 1994).

The Southern Regional Education Board (SREB) believed that retraining the general education track is a major obstacle in improving the high school experience (Bottoms et al., 1992). The federal legislation of Carl D. Perkins Vocational and Applied Technology Education Act Amendments of 1990 was reauthorized and offered funding to implement tech-prep programs to improve these problems. Currently, tech-prep programs are implemented as a nationwide education reform in each state in America.

Planning phases and strategies of tech-prep programs

Parnell (1991) mentioned the development of Tech-Prep/Associate Degree (TPAD) programs should emphasize five “C's”–

- Continuity in learning;
- Context-based teaching (applied academics);

- Competency-based teaching;
- Communication between learning institutions (especially between high schools and postsecondary institutions); and
- Completion of the program with an associate degree. (p. 26)

Several trends reinforce the importance of carrying out tech-prep initiatives. Bragg (1991) indicated that serious problems have surrounded American school systems:

- rapid advancements in technology;
- global economic competition;
- dramatic changes in the workplace;
- deficits in workplace basic skills;
- high dropout rates from secondary schools. (p. 1)

Therefore, educational leaders are committed to state and local tech-prep initiatives that can improve the quality and overcome the above problems of secondary and postsecondary education.

The degree of success in implementing any program rests on the adequacy and thoroughness of the operational plan developed, the adequacy of resources available, and the timelines and competencies of those implementing the plan. In order to ensure the best plan possible, all partners of the TPAD program effort should be involved (Dutton, 1991).

The process of planning, developing, and implementing a TPAD program is very labor-intensive. The use of committees is a very common and productive way of involving large numbers of people and dividing up the workload. The committees may be given different names and the tasks within the committees may be grouped differently. The committee structure is described in Figures 2.3 - 2.5.

Planning a new initiative that restructures an educational system is difficult but many people agree that it is very important and can pay-off in the long run. According to the Carl

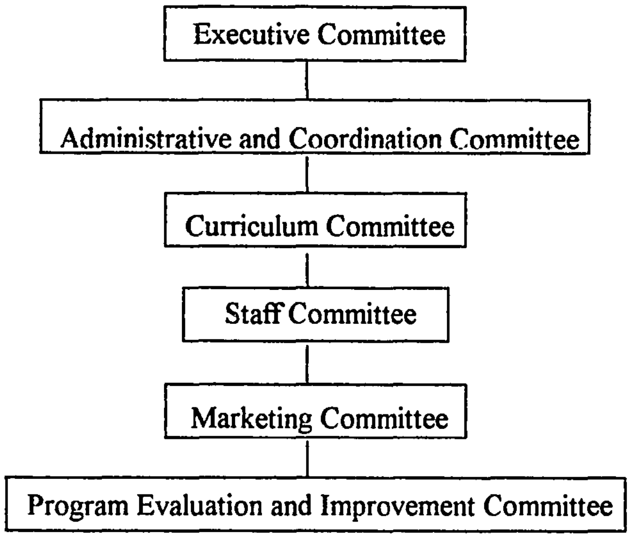


Fig. 2.3. Organizational structure for tech-prep programs—core committees (Dutton, 1991; State Center Community College, 1990; Tri-County Technical College, 1990b)

D. Perkins Vocational and Applied Technology Education Act Amendments of 1990, the tech-prep initiative has been conducted through supporting federal funding as a nationwide effort. Based on the sequence of planning strategies used by the Illinois' tech-prep initiatives, Bragg (1991, p. 16) described the tech-prep planning strategies in Table 2.1 (see p. 41).

The following activities are included when starting a tech-prep initiative stage:

- creating a local tech-prep philosophy and planning approach;
- selecting key groups to participate in the planning phases;
- gaining top leader support;
- educating project staff about tech-prep;
- creating an organizational planning structure;
- developing planning teams;
- setting realistic timelines. (Bragg, 1991, p. 17)

To develop a local philosophy about tech-prep, planners should know: (a) what the purpose is; (b) who should participate; (c) how the tech-prep planning process should be

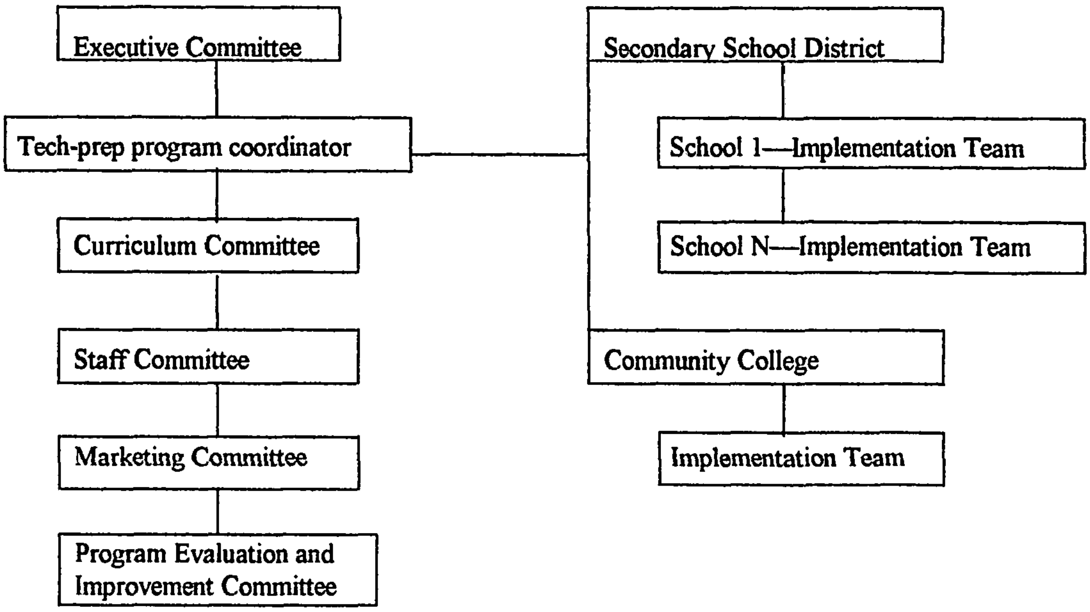


Fig. 2.4. Alternative organizational structure for tech-prep programs—core committees, program coordinator, and implementation teams (Ohio State University, 1990)

conducted; and (d) how to evaluate whether tech-prep is working. The following stakeholders should be included when selecting key groups: (a) faculty (academic and technical education in secondary and postsecondary schools); (b) administrators (college presidents and deans, superintendents, school principals, tech-prep directors/coordinators, and counselors); (c) business, industry, and labor representatives; (d) state agency staff; (e) students; and (f) parents. In order to obtain a better understanding of tech-prep, the planners should be flexible and adjust to changing needs, preparing resources, and overcoming barriers. In addition, these groups should be involved very early to provide staff development for

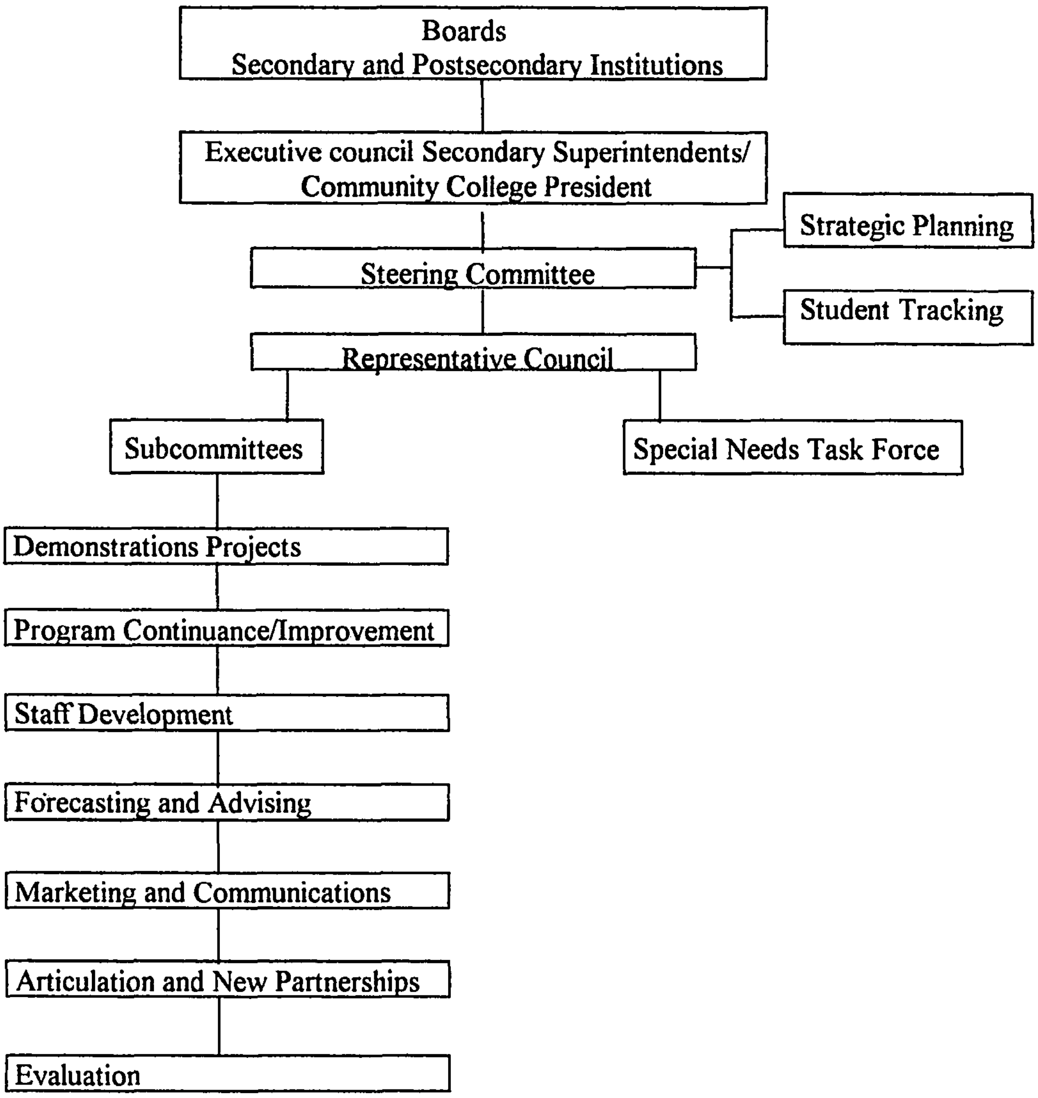


Fig. 2.5. Alternative organizational structure for tech-prep programs—core committees, multilayered leadership, steering committee, and representative council (Portland Area Vocational/Technical Education Consortium [(PAVTEC)], 1990)

Table 2.1. Tech-prep planning strategies

Plan to plan tech-prep	• Develop a local philosophy that clearly states reasons for undertaking tech-prep
Formulate clear short- and long-term goals for tech-prep	• Relate the goals of tech-prep to the mission of each participating educational institution and employer
Forecast the future for tech-prep	• Determine employment opportunities and trends in the community • Prioritize program areas/occupational clusters • Identify future opportunities and obstacles in meeting tech-prep goals
Prioritized tech-prep goals, establish measures, and state desired outcomes	• Decide which tech-prep goals are most critical • Develop concrete statements about the outcomes of each high priority goal and how the outcomes can be measured • Develop student and program outcomes
Develop and select alternative strategies for tech-prep goals	• Develop and field test tech-prep components • Continuously experiment with new and better tech-prep components • In-service educators and business, industry, and labor representatives
Implement the tech-prep plan	• Involve student in courses in which teaching methods and content in some lessons have been revised to include applications and integrated learning
Evaluate the tech-prep plan	• Evaluate the tech-prep planning process to make improvements • Determine whether the tech-prep plan is producing desired outcomes
Revise and improve the tech-prep planning process	• Review planning strategies on an ongoing basis with key groups and planning teams • Incorporate changes in the planning process to make continuous improvements in tech-prep

faculty, materials and equipment for applied instruction, common time for joint planning, opportunities to communicate and share success, and involvement from top institutional leaders.

Planning teams are groups contributing to accomplish the shared goal of planning tech-prep. Positive communication is facilitated, resulting in an atmosphere of cooperation, trust, and open sharing. As to the timelines, Bragg (1991) indicated that the Illinois planners had provided some guidelines for starting particular aspects of the planning and implementation processes. Clearly, the more time and energy involved in getting started with tech-prep, the greater are the benefits. Based on the local philosophy to design the major components of tech-prep, Bragg (1991) proposed eight components and explained the purpose of each as shown in Table 2.2. In this stage, the objectives of each component must be developed and accomplished step-by-step and coordinated with the other components. This will facilitate a smooth implementation of future tech-prep programs.

Table 2.2. Tech-prep components

Component	Purpose
Local Policies	Set policies about issues important to each local participating institution
Staff Development	Assist professional staff in understanding, accepting, and implementing tech-prep and in understanding current workplace practices
Articulated Curriculum	Coordinate a planned sequence of coursework that prepares students with academic and technical skills for the workplace
Curriculum Development	Involve academic and technical faculty in jointly designing curriculum hat is application-based and academically and technically integrated
Written Agreements	Solidify roles and responsibilities of participating institutions and specified programs
Guidance and Counseling	Identify key roles and functions of counselors in tech-prep
Marketing	Develop effective techniques for communicating tech-prep internally and externally
Business/Industry Collaboration	Identify various ways of involving business, industry, and labor in meaningful partnerships with education

The Carl D. Perkins Vocational Education Act of 1984 (also called Perkins I) was designed to give states a wide latitude in the content and range of programs and supplemental services (Elmore, 1987). In providing this latitude, Perkins I earmarked funds for program improvement, innovation, and expansion. It also provided a mechanism by which some states initiated the development of tech-prep. This foundation was significantly enhanced with the reauthorization of the Perkins Act, which included the Tech-Prep Education Act of 1990. The purpose of the Tech-Prep Education Act is to initiate action and to muster the political support to construct a successful education coalition. The Act sets the frame of reference for determining what problems are important and what outcomes are regarded as success. Also, administrators and service deliverers in certain key implementation roles must fill in the details of this problem at their own levels. They must bring the resources of organizations and individuals to bear on the solution (Dornsife, 1992a).

To facilitate communication and planning, representatives involved schools, colleges, and consortium partners. It was through these team interactions that an environment conductive to implementation of tech-prep seemed to be created. This environment was one facilitative of dialogue among teachers and administrators within and across institutions to generate new ideas and reach common understanding about tech-prep (Bragg, 1992b).

Once a baseline of understanding was obtained about tech-prep and key components such as curriculum were being planned and tested, an attempt was made to create an awareness of tech-prep with a larger circle of stakeholders. Some of the approaches included organizing a speaker's bureau, developing videos, brochures and other marketing tools, and involving local planners in sharing information with peers in education and business/industry settings (Bragg, 1992b).

By the end of the planning phase, partners sought to accomplish the following:

- have partnering organizations committed
- have board representation of stakeholder groups involved in planning curriculum and marketing programs
- involve more educators, employers, students, parents, and members of the general public in the initiative. (Bragg, 1992b, p. 5-14)

Rigorous evaluation and research needed to be addressed. Clearly, a critical need for evaluation existed which must be met through the collaborative efforts of all tech-prep stakeholders.

Implementation of tech-prep programs

Clarity of purpose is critical to the success of any educational innovation (Fullan, 1991). Without a clear vision, there is concern that tech-prep will not gain the momentum and acceptance needed for it to be fully adopted. The policy of implementing tech-prep is based on the federal Perkins II legislation. According to Layton and Bragg (1992), the following common statements are offered by the states for the purpose of implementing tech-prep:

- to ensure better transition of youth from school to work.
- to provide applied academics and employability skills.
- to provide a comprehensive career preparation program that should begin earlier than high school.
- to serve the 'neglected majority'.
- to eliminate the general track.
- to require advanced technical skills programs.
- to eliminate redundancy between secondary and postsecondary education.
- to provide the solution for common schooling problems.

- to assist in moving toward competency-based curricula.
- to upgrade vocational curricula and strengthen the academic focus. (p. 4-5)

Tracking within high school curricula is viewed as detrimental to providing a well-rounded, challenging education for many students, particularly students who are counseled into general or vocational tracks (Oakes, 1992). However, the earlier thinking of Parnell (1985) focused on tech-prep as a replacement for the general education track. The actual implementation to any one track within high school curricula seemed varied.

Tech-prep is viewed as a replacement for general education, as Parnell first suggested, resulting in only a slightly different three-track approach, i.e., college prep, tech-prep, and vocational education. Otherwise, tech-prep is being adopted as the only alternative to the college preparatory option, by creating a dual track system. The general and vocational tracks appear to be subsumed by tech-prep. Tech-prep appears to be providing a means of reformulating curriculum to move away from tracking, with the intent being to increase options for advanced education or employment for larger numbers of students.

The goal has been to eliminate tracks and create options for the majority of students to move in and out of college prep, tech-prep, and vocational courses by requiring all students to complete basic academic requirements for college. According to Bragg (1992b), often these schools are organized around problems, themes, or career cluster areas that cut across the entire high school curriculum. Since tech-prep is a latecomer to the educational reform parade, it is important that it be recognized as an approach that blends both vocational and academic education in order to obtain wide-spread support. Resources in terms of dollars, people, curricular materials, facilities, and technological innovations are critically needed to make tech-prep successful (Bragg, 1992b).

Leadership at all levels of the educational system is needed successfully implement tech-prep. It is essential to ensure that people can plan, implement, and evaluate tech-prep. Finally, tech-prep must be sustained over a number of years to ensure full implementation of this wide-scale and comprehensive innovation. Problems created by leadership can seriously deter the institutionalization of tech-prep. Fullan (1991) described the time frame required for implementation of educational innovations within an organization as being at least five years. It seems reasonable to expect implementation of tech-prep to take even longer due to the involvement of many educational organizations and partnerships. Planning must be conducted at a pace that can sustain implementation throughout the decade, if tech-prep is to be fully adapted (Bragg, 1992b).

In South Carolina, an amendment to the state plan called for a tech-prep education program entitled, 'Preparation for the Technologies', which again echoed the federal program. In addition, the legislation called for a restructuring of the Department of Education to transform it from a regulatory agency to a service agency as part of the state's Total Quality Education effort (Layton & Bragg, 1992), the concept coming from W. E. Deming's, Total Quality Management (TQM) approach (1986).

Models of tech-prep programs

Given the many models of articulation, which one–if any–is tech-prep? No clear definition has as yet emerged, either in the literature or as a result of the 1990 reauthorization of the federal Carl Perkins Act. Tech-prep models reported at various conferences differ substantially in their breadth and structure. Most begin at Grade 11; a few begin earlier. All are articulated in some manner with college technical training. According to Norton and Faddis (1992), despite the confusion, three essential components seem to emerge from discussions of tech-prep:

- Tech-prep includes strengthened (e.g., applied) academics for vocational or general education students.
- Tech-prep includes some form of articulation of secondary (vocational or general education) programs with 2-year college technical programs.
- Tech-prep includes in-service/professional development for secondary faculty and staff. (p. 9)

In addition, Norton and Faddis (1992) proposed two more elements of tech-prep extend beyond Grade 11-14; these are probably not essential but add immeasurably to the long-term effectiveness of a tech-prep program:

- Tech-prep (ideally) includes expanded career education programs–beginning at least as early as middle school–with a strong emphasis on preparation for vocational-technical careers.
- Tech-prep (ideally) includes vigorous community education programs to counteract myths in the minds of parents and other influential adults about the supposed low status, low income potential, and general undesirability of vocational-technical careers. (p. 9)

The first and foremost goal of all tech-prep efforts is to increase the number and quality of students coming into and completing postsecondary technical training or apprenticeships–the skilled technicians and journeyworkers upon whom America's future economy will depend. If the foregoing analysis of tech-prep components is accurate, development of some form of vocational-technical articulation agreement(s) is essential (though not sufficient) for an effective tech-prep program.

Some tech-prep purists believe that the 'real' tech-prep specifically includes the advanced skills model of articulation. As discussed earlier, however, the time and expense necessary to develop a true advanced skills type of articulation can only be justified if it reaps extra benefits are needed (e.g., increased income, more promising career ladders) for the program's graduates, not for industry alone. Where those extra benefits are not available, it is probably better to use one of the other, simpler articulation models (Norton & Faddis, 1992).

Tech-Prep Associate Degree (TPAD) models are a rigorous approach to secondary/ postsecondary articulation. This model adds the concept of applied academics (i.e., integrating academic learnings from math, science, and communications areas with technical education) to the advanced curriculum articulation approach. Beginning in high school, students participate in applied academic coursework in the areas of math, science, communications, and technology. A minimum of two years of secondary education followed by two years postsecondary education is required for the TPAD. The focus of education remains in the application of academic and technical concepts in broad career cluster areas. More intense technical education specializations are developed during the thirteenth and fourteenth postsecondary years in a wide variety of areas linked to vocational-technical education (Bragg, 1991).

There are several successful tech-prep National Model Sites (nine U.S. Department of Education Model Demonstration Projects and fifteen Model Tech-Prep Sites):

1. Capital Area Tech-Prep Consortium, Austin, TX
2. Consortium to Restructure Education Through Academic and Technological Excellence

[(CREATE)], Oklahoma City, OK

3. Lexington School District Four of the Central Midlands Tech-Prep Consortium, Swansea, SC
4. Los Angeles Area Tech-Prep Consortium, Los Angeles, CA
5. Mt. Hood Regional Cooperative Consortium, Gresham, OR
6. Norfolk Public Schools/ Tidewater Community College, Norfolk, VA
7. Northeastern New Mexico Tech-Prep Consortium, Las Vegas, NM
8. Oakland County Tech-Prep Consortium, Oakland County, MI
9. Partnership for Academic and Career Education [(PACE)], Pendleton, SC
10. Portland Area Vocational Technical Education Consortium [(PAVTEC)], Portland, OR
11. Rhode Island Tech-Prep/Associate Degree Program Model, Warwick, RI
12. Richmond County Tech-Prep - Richmond County Schools/Richmond Community College, Hamlet, NC
13. Roanoke Area Tech-Prep Consortium, Roanoke, VA
14. Seattle Tech-Prep, Seattle, WA
15. Southern Maryland Education Consortium, La Plata, MA, produced by the Center for Occupational Research and Development [(1993)] and funded by the U.S. Department of Education).

In addition, the Center for Occupational Research and Development (CORD) presented the flow chart of Tech-Prep/Associate Degree (TPAD) as shown in Figure 2-6. Other curriculum models were mentioned in each local consortium and in CORD.

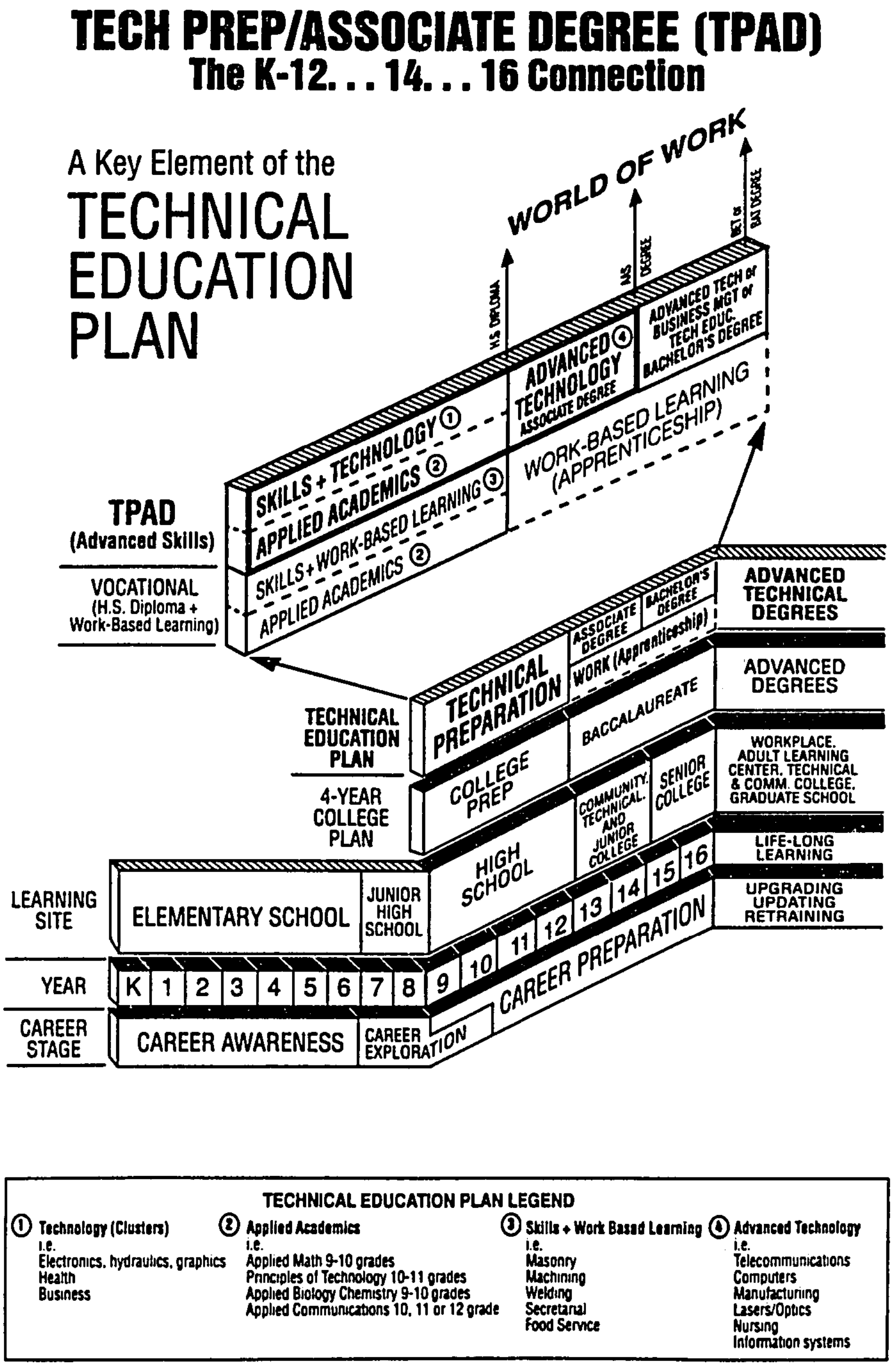


Fig. 2.6. Tech-Prep/Associate Degree (TPAD) flow chart (Hull, 1992, p. I.D.2)

Barriers in implementing tech-prep

Layton and Bragg (1992) reported barriers and successes in their survey results from state and local tech-prep initiatives. Where tech-prep is seen as a total restructuring effort, other barriers impose themselves. A fear of and resistance to change leads to turf battles and difficulties in efforts at collaboration between traditionally separated groups. However, these barriers can be seen in a positive light. These conflicts may demonstrate that at least communication has begun and territories are no longer taken for granted. If these barriers are to be overcome, states must either make an effort to improve the image of vocational education, or put some philosophical distance between tech-prep and vocational education (Layton & Bragg, 1992).

In Opening Minds, Opening Doors , Hull (1993) listed some barriers gathered by brainstorming from tech-prep project directors. Most of these barriers are people–related issues as well, and stem from a very basic human emotion–fear.

As to successes of tech-prep, Layton and Bragg (1992) presented them in a survey report as follows:

- High level of enthusiasm for tech-prep
- Collaboration between secondary and postsecondary educators
- Involvement of entire state and access to tech-prep programs
- Increased awareness of tech-prep in educational community and the public
- Progress of tech-prep program statewide
- Integration of vocational and academic education
- Development of articulation agreements
- High degree of involvement in the state
- Collaboration of tech-prep coordinators
- Encouraging and obtaining a variety of approaches
- worksite learning projects
- Integrating tech-prep into larger reform efforts

- Business and industry involvement
- Overcoming fear of change
- Acceptance of applied learning
- Distributing funds to all projects
- Acquiring administrative support
- Building networks within the state
- Establishing and adopting tech-prep guidelines
- Collaboration of vocational and academic educators
- Applying the TQM approach to implementation (p. 4-15)

Some states have had great success in overcoming one of the commonly mentioned barriers--getting secondary and postsecondary educators together. This would tend to support the notion that the breaking of such barriers may be the beginnings of success. If the level of enthusiasm for tech-prep can be maintained or increased, it is likely that other major barriers can also be overcome (Layton & Bragg, 1992).

Integration of vocational and academic education

Raizen (1989) reported that one recommended approach to meet the demands of today's workplace is through the integration of vocational and academic education. Further, Bailey (1990) has shown that today's workplace is changing and the skills of workers must change as well. In the decade since A Nation at Risk castigated the public schools, parents, and educators, and a flurry of reports have echoed employers' concerns about low basic skills and lack of 'higher order thinking skills' (Resnick, 1987). As a result, many school reformers seek to make academic learning more meaningful for all students to prepare them better for the world of work. Integration has captured the interest of educators, employers, and academics, each of whom sees it as a potential solution to specific problems (Stasz & Grubb, 1991).

Policymakers at the federal level have added their own pressures for integrating vocational and academic education. In the most recent manifestation of the continuing pressure to make vocational education more general, the Carl D. Perkins Vocational and Applied Technology Education Amendment Act of 1990 required that every program supported by federal funds, ". . . integrate academic and vocational education in such programs through coherent sequences of courses so that students achieve both academic and occupational competencies" (section 325). Therefore, federal legislation provides both the resources for integration and the pressure to do so.

Integration of academic and vocational education is critical to the success of tech-prep. Roegge (1991) provided guidance on integrating technical and academic education in Illinois. One important strategy stressed by Roegge is common planning time. Instructors involved in tech-prep need a common planning time to facilitate joint planning of curriculum and teaching strategies. This encourages the integration of technical and academic instruction which is the key to the success of tech-prep.

Various strategies are evolving as viable approaches for integrating academic and technical education. Specifically, eight models for integrating academic and vocational-technical programs have been identified by Grubb et al. (1991) at the National Center for Research in Vocational Education (Brown et al., 1991).

Currently, a response to the call for curriculum reform, especially from vocational educators, is one that advocates integration of vocational and academic education. The National Commission on Secondary Vocational Education (1984) offered six recommendations intended to achieve a more integrated curriculum. Tanner and Tanner (1980), along with several other curriculum theorists, discussed three ways to organize a subject curriculum (correlated curriculum, fused curriculum, and broad fields curriculum) and two alternatives to the subject curriculum (core curriculum and activity curriculum). Plihal et al. (1992, pp. 69-71) recommended two models to integrate vocational and academic education.

Tech-prep is a promising development which, if properly implemented, has the potential to lead to the improvement of secondary and postsecondary education as well as the school-to-work transition and to increase access of all Americans to a high quality work life that is not only economically rewarding but also personally fulfilling (NCRVE, 1992).

In a systems approach to education, feedback is the vitally important component that completes the loop, leads to the improvement of processes, and produces higher quality outputs (Layton & Bragg, 1992). By integrating vocational and academic education to develop curriculum, tech-prep programs will be easily and successfully to be implemented.

Total quality management (TQM) approach

Tech-prep is intended to prepare a workforce for the United States to compete with world class standards. Competition on this level requires an ongoing improvement of America's educational and economic systems as technology and production advance.

Therefore, a potential approach to accomplishing quality-improvement goals for both systems is through total quality management (TQM). There are many parallels between TQM and tech-prep as both are focused on:

- reforming and improving systems,
- empowering teams representing a variety of stakeholders to make improvements, and
- using measurements as the basis for all continuous quality improvement efforts. (Kirby & Bragg, 1992, p. 6-1)

A simple definition of TQM is, ". . . the unyielding and continually improving effort by everyone in an organization to understand, meet and exceed the expectations of customers" (Procter & Gamble, 1989, p. 1). The success of any new educational initiative such as tech-prep depends on the design and maintenance of interactions between educational systems, businesses, and the processes within and between those institutions. Tech-prep may represent one introductory pathway to implementation of TQM strategies in education (Kirby & Bragg, 1992). Coates (1990) summarized one institution's TQM approach in an educational setting with this advice and seem appropriate for tech-prep implementation as well:

- Support from leadership is essential.
- Enlist a champion for the cause who will see it through the difficult trails of increased workload and cost.
- Learn by doing. Implement TQM as soon as leadership is familiar with the steps.
- Teams are the essence of TQM.
- Training is necessary to ensure solutions are implemented.
- The service side is an easier place to start than the academic side.
- Early success is necessary to get momentum going. (pp. 26-35)

The complex problems facing educators charged with improving the preparation of tomorrow's workforce demand an entirely new approach to problem solving. The era when educators had to answer only to the local, often isolated, community no longer exists. Preparing students for work that changes as rapidly as technology dictates requires that the educational process embrace change. Students must be taught to anticipate, encourage, and manage change on a daily basis (Secretary's Commission on Achieving Necessary Skills, 1991).

In order to improve quality, the theories and philosophies of Deming, Juran, and Crosby have attracted the attention of educators. In addition, planning for change requires extensive participation by the customers (Juran, 1990). The customers of tech-prep education include those internal (e.g., educators, parents, students, administrators) and external (e.g., employers, labor, taxpayers) to the process. Keeping the intent of the legislation at the forefront of tech-prep planning processed provides both internal and external customers common quality goals to work toward. When selecting an approach to TQM, businesses frequently report that one or another TQM approach is not satisfactory, so a blend ideas from several theorists is needed to create a TQM style that suits their company's situation. Juran's approach to implementation of strategic quality management may be used for the purpose of illustrating the parallels between TQM and tech-prep (Kirby & Bragg, 1992).

The guiding principles provide the basis for the development of any TQM system. An examination of the principles provided by theorists reveals similarities with the principles of tech-prep. Some of the similarities include the importance of meeting customer or student needs, a focus on improving processes, the importance of planning, and the use of systematic measurement and evaluation. The common principles of TQM and tech-prep are presented in

Table 2.3. The Juran's TQM prerequisites (1990) and tech-prep implementation strategies are shown in Table 2.4.

The parallels between TQM and tech-prep implementation include: (1) use of a broad-based democratic process to create a vision of change and goals for improvement; (2) involvement of personnel at all levels of organizations; (3) education and training of all participants; (4) use of measurements to make improvements; and (5) ongoing review and feedback. Research on educational change reinforces the importance of a vital staff development component for any new educational program (Fullan, 1992; Fullan et al., 1990; Little, 1990; Stallings, 1989). While it is impossible to predict every challenge that could

Table 2.3. Seven common principles of TQM and tech-prep programs

TQM Principles	Tech-Prep Principles
Customer needs drive quality improvement.	student needs drive tech-prep.
End-to end processes are the focus of quality improvement.	Articulation, integration, and collaboration are end-to-end processes key to tech-prep.
Everyone manages a process specific to his/her work.	Everyone manages a process related to tech-prep.
Quality improvement never ends.	Quality improvement never ends.
Planning ensures high quality products and services.	Planning ensures high quality outcomes for tech-prep.
Valid measures are the basis for continuous improvement of work processes, products, and services.	Valid measures are the basis for continuous improvement of all aspects of tech-prep.
Leadership development for all is essential to making TQM work.	Leadership development for all is essential to making tech-prep work.

Source: Kirby and Bragg, 1992, p. 6-11.

Table 2.4. The relationship between TQM and tech-prep implementation strategies

Juran's Prerequisites	Tech-prep Implementation
Provide leadership from executive staff.	Gain support from leaders for tech-prep
Establish the quality vision and policies.	Create a shared quality vision and policies to support tech-prep.
Establish broad quality goals.	Formulate and prioritize quality goals.
Deploy the quality goals to all levels of the organization.	Deploy the goals of tech-prep throughout the entire consortium.
Provide the needed resources, including training.	Provide the needed resources, including training.
Establish measurements.	State desired outcomes and establish measurements.
Review performance regularly.	Review performance regularly.
Revise the rewards system to give adequate priority to quality improvement	Revise the reward system to give adequate priority to quality improvement of tech-prep.

Source: Kirby and Bragg, 1992, p. 6-12.

stand in the way of using TQM to implement tech-prep, it is possible to anticipate areas by examining the difficulties other business and educational institutions have encountered with the approach (Kirby & Bragg, 1992).

Kouzes and Posner (1990), authors of The Leadership Challenge, sought to provide both practical and inspirational advice to leaders. They stated it all comes down to attitude–the type of attitude that challenges the process. They offered three important lessons from their research that have direct application to leaders charged with implementing tech-prep and exemplifying the environment created by TQM.

The goal of improving quality is at the heart of tech-prep and TQM. Each initiative entails comprehensive change in the way education and business are conducted. Each provides a process for reform and continuous quality improvement. Furthermore, each contributes strategies for retooling America's workforce and increasing the country's economic competitiveness. An ongoing performance review is vital to continuous improvement. These reviews should focus on determining the degree to which the quality goals and outcomes are being met. When problems arise, feedback should be provided to team members to ensure quality improvement (Bragg, 1992c).

The concepts of customer, teamwork, and continued improvement are similar between TQM and tech-prep. Therefore, by using TQM principles and approaches to design and continue to improve the new educational reform--the tech-prep program, it is important to serve customers/students, and to promote a lifelong learning. By using TQM approaches , tech-prep may provide an effective, efficient, and high quality education system to transit young people from school-to-work and to further education. Also, tech-prep may produce a technologically skilled workforce to fill the increasing number of technically demanding occupations.

Attitudes toward the implementation of tech-prep programs

Definition of attitude

Thomas and Znaniecki (1918) defined attitude as:

> A mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's responses to all objects and situations with which it is related. (p. 21)

Baron (1983) presented the definition of attitude as: "Enduring clusters of feelings, beliefs, and behavior tendencies directed toward specific persons, groups, ideas, or objects" (p. 230). DeFleur and Westie (1963) noted that attitudes are to make reference to elements such as motivational process, cognition, and perceptual orientations.

Fleming and Levie (1978) pointed out that attitudes can vary in direction, either positive or negative; in degree, the amount of positiveness or negativeness; and in intensity, the amount of commitment with which a position is held. Also, attitudes are latent and not directly observable in themselves. They act to organize, or to provide direction to action and behaviors that are observable (Simonson, 1979a).

Additionally, attitudes have been defined to have three components: affective, cognitive, and behavioral (Zimbardo & Ebbesen, 1970). The affective component refers to the emotions connected with that object (idea, person, thing, or situation). The cognitive component refers to the knowledge or intellectual beliefs that an individual might have about an object. The behavioral component refers to how a person acts (DuBrin, 1984).

Both the cognitive and affective components of an attitude influence the way one intends to behave toward an attitude object. However, many different behavioral tendencies are possible, given a particular pattern of beliefs and feelings (Dunham, 1984). Because of their role in a very wide range of human activities, attitudes have been the subject of intensive study for several decades. In fact, it is probably safe to suggest that in some fields (e.g., psychology), more studies have been concerned with attitudes than with any other single topic.

The importance of attitude in education

Most attitudes are quite complex because each of the three components involved can be complicated. Attitudes reflect a person's previous reinforcement history; as such, attitudes are learned. The determinants of a person's attitudinal system include societal influences, major group memberships, the family, peer group, and prior work experience (Organ & Bateman, 1986).

Katz (1960) suggested that four personality functions are served by the maintenance and modification of social attitudes: adjustment, ego defense, value expression, and knowledge. An attitude that no longer serves its function will cause the individual holding that attitude to feel blocked or frustrated.

When designing a teaching activity, the educator should recognize the need for establishing attitudinal goals and for planning activities to produce effective outcomes in learning as a consequence of an instructional sequence. Student opinions toward learning activities that teachers are constructing need to be assessed. Whatever the reason, attitudinal outcomes should be important considerations. There are many intervening factors likely to influence the relationships between how teachers and students feel and how they act. Probably, the development of desirable attitudes in teachers and students should be a goal in itself (Simonson, 1979a).

Dashner (1980) indicated that the concept of attitude is one of the more popular and controversial concepts in contemporary social psychology. Many related disciplines also have used this concept in their approaches. Perhaps, no other term has been so extensively used by theorists and researchers in the behavioral sciences (Schuman & Johnson, 1976; Wicker, 1969). As a psychological construct, an attitude is a hypothetical variable that operates within individuals as a hidden variable to shape and give stimulus (Dashner, 1980).

Many attitude measures have names that are self-explanatory (e.g., job satisfaction, computer anxiety). The developer can identify attitudes that can measured, then measures can be created (Huang, 1993). Attitudes are often measured in educational research because of their possible predictive value. An important study concerned with this use of attitude scales was done by Tittle and Hill (1967). They compared the effectiveness of various types of attitude scales in predicting objective indices of voting behavior.

Attitude scale and characteristics

Scales are frequently developed to measure the individual's attitude toward a particular group, institution, or institutional practice. Since attitudes are defined as latent and not observable in themselves, the teacher or developer must identify behaviors that would seem to be representative of the attitude in question so that these behaviors might be measured as an index of the attitude construct. Generally, attitude measures development and should utilize appropriate test construction techniques. Simonson (1979b) and Henerson et al. (1990) recommended that attitude measures should be valid, reliable, replicable, and simple to administer, explain, and understand.

Henerson et al. (1990) indicated four techniques for collecting attitude information: self-reports, reports of others, sociometric procedures, and records. Each of these can be used to measure attitude-related behaviors. Most commonly, attitude measurement is accomplished by using one of the following tools: questionnaires, rating scales, interviews, written reports, observations, and sociometrics. In general, there are six steps used in the creation of an attitude measure: (1) identify the construct to be measured; (2) find an existing measure of the construct; (3) construct an attitude measure; (4) conduct a pilot study; (5) revise tests for actual use; and (6) summarize, analyze, and display results (Diab, 1967; Henerson et al., 1990). In measuring attitude, the designer should attempt to locate an instrument that will measure the relevant construct. The use of standardized measures will simplify the job of attitude evaluation for the teacher or developer. If no existing measure of the relevant attitude is available, the teacher or designer will need to construct his or her own test.

Four major types of attitude scales are: summated rating scales (Likert scales), equal-appearing interval scales (Thurstone scales), cumulative scales (Guttman scales), and semantic differential scales of Osgood et al. (Ary et al., 1990; Borg & Gall, 1989; Zimbardo et al., 1977). The Likert-type method is preferred to all the other scale types and used frequently. The Likert-type method has three advantages: (1) such scales are easy and inexpensive to administer; (2) normally has high reliability; and (3) the apparent correlation can be found between agreement scale scores for attitudes and related behaviors (Henerson et al., 1990; Hurt et al., 1977).

The use of attitude scales or questionnaires is based on an eminently reasonable assertion–the best way to find out about others' attitudes is, quite simply, to ask them. Consistent with this view, attitude questionnaires contain numerous items that ask individuals to report on their feelings, beliefs, and behavior tendencies with respect to some topic (Baron, 1983).

When a test is conducted, the reliability and validity information is critical and collected for the measure. Assessment of validity and reliability help to determine the amount of faith people should place in a measurement instrument (Henerson et al., 1990; Mehrens & Lehmann, 1973). According to the American Psychological Association et al. (1985), "Validity . . . refers to the appropriateness, meaningfulness, and usefulness of the specific inferences made from test score. Test validation is the process of accumulating evidence to support such inferences" (p. 9). Reliability indicates how consistently a measure is likely to be, in a given situation, for telling you whether a measure is reliable. Basically, four types of test validity are recognized: content, concurrent, construct, and predictive validity. Content validity was used in the present study. Also, there are several methods of determining reliability that can be easily used by the attitude test developer. Split-half and test-retest methods are frequently used. Cronbach's alpha reliability coefficient is the average of all possible split-half reliability coefficients and is widely used (Bryman & Crammer, 1990). However, there is no single, established method for determining validity and reliability, and the developer should carefully use the chosen method in constructing, administering, and interpreting measures and results.

Attitude measurement and change

Attitudes have been the subject of intensive study for several decades because of their role in a very wide range of human activities. The most common procedure for assessing attitudes involves the use of attitude scales or questionnaires. Under ideal conditions, the answers respondents provide about their attitudes about the topic should be honest and accurate. However, changing attitudes are very common. Perhaps the most common technique for reducing attitude change involves the use of persuasive communications. These consist of written, spoken, televised, or filmed messages that seek to alter attitudes through logical arguments and convincing facts.

In addition, when attitudes and behavior do not match, dissonance can be a basis for change. In short, according to the theory of cognitive dissonance, human beings dislike inconsistency. In any case, both dissonance and effects of attitude-discrepant behavior should be avoid. They can serve as the basis for important shifts in attitudes. Also, the frequency-of-exposure effect appears to play an important role to reduce positive reactions. Furthermore, job satisfaction and prejudice should be considered when attitudes will be measured (Baron, 1983). Therefore, Maslow's needs hierarchy and Herzberg's motivator-hygiene approach are the important theories of job satisfaction.

In summation, an attitude is an individual's predisposition to evaluate an object in a favorable or unfavorable manner. It consists of cognitive (beliefs), affective (emotional), and behavioral components. Attitudes as measured by pencil-and-paper instruments do not necessarily predict the respondent's behavior very well. Just how closely attitudes and behavior correlate depends on the specificity of the attitude object, the situational constraints on the person's behavior, and whether or not situational cues make the attitude salient. Attitudes change, then, in response to changes in needs they serve. The effectiveness of persuasive messages in changing attitudes depends on characteristics of the source, the message itself, and the target (Organ & Bateman, 1986).

Summary

No program develops without difficulties, and tech-prep programs are not an exception. People problems, policy challenges, and funding dilemmas will all place obstacles in the path of successful development. However, tech-prep programs work. Issues can be resolved and obstacles overcome, and the reward for the work involved in overcoming the difficulties is a strong, smoothly functioning system that fulfills the expectations of all involved (Belcher, 1991). Communication mechanisms (e.g., newsletter, e-mail, meetings) must be accessible to any participant in the delivery process and must consistently reach all participants. An open mind to communicate with all participants from the top down is necessary to reduce barriers.

Tech-prep is a promising development which, if properly implemented, has the potential to lead to the improvement of secondary and postsecondary education as well as the school-to-work transition, and to increase access of all Americans to a high quality work life that is not only economically rewarding but also personally fulfilling (NCRVE, 1992b).

CHAPTER III. METHODOLOGY

Introduction

This chapter describes the methodology used to investigate secondary and postsecondary school tech-prep teachers' and administrators' attitudes toward tech-prep programs in the United States. In this chapter, the design of the study is described first, then the population and sample, instrumentation, the methods of data collection, and data analysis are presented separately.

Design of the Study

Descriptive data was required to fulfill the purposes of the study; therefore, a descriptive survey was utilized. Kerlinger (1979) mentioned:

> Descriptive surveys seek to determine the incidence and distribution of the characteristics and opinions of populations of people by obtaining and studying the characteristics and opinions of relatively small and presumably representative samples of such people. The basic purpose of surveys used in this way is not scientific but rather action and policy-oriented. (p. 151)

Borg and Gall (1989) indicated that survey research is a distinctive research methodology that is a practical tool to obtain effective information in education and can also be used to explore relationships between different variables.

> The research method accounts for a substantial proportion of research done in the field of education. The survey research method is frequently used to collect information relevant to interests and problems in many fields and utilizes a variety of instruments, methods, and comparisons between groups. (p. 147)

The survey research method is frequently used as a means of collecting information and provides for systematic data collection about interests and problems. Therefore, a variety of instruments, methods, and comparisons between groups is utilized in survey research (Borg and Gall, 1989).

Population and Sample

Tech-prep teachers and administrators selected from ten states in the United States were the population in this study. The samples were selected for inclusion in this study from the population of tech-prep teachers and administrators in secondary and postsecondary schools receiving tech-prep funding from the federal government. The samples were selected based on the following criteria: the ten states that received the highest dollar amount of federal funds for tech-prep programs as identified from the survey report of the fiscal years 1992 and 1993 (Bragg, 1992a); and recommended by the National Tech Prep Network Coordinator of the Center for Occupational Research and Development (CORD). These selected states were: Illinois, Indiana, Maryland, Michigan, North Carolina, Oregon, Pennsylvania, South Carolina, Virginia, and Wisconsin. The directors of the tech-prep programs in the identified states were then contacted and asked to provide recommendations of two secondary and two postsecondary schools having the strongest tech-prep programs which have been implemented at least two years in the state.

There were a total of forty schools, twenty secondary and twenty postsecondary schools, included in this study. The designated people at the secondary and postsecondary schools were then contacted. Five copies of the survey instruments were mailed to them and they were asked to distribute these surveys to tech-prep teachers and administrators involved in tech-prep programs. The total number of samples selected for this study included tech-prep teachers and administrators from each of four schools in each of the ten selected states, for a total sample of two hundred.

Instrumentation

In order to obtain sufficient valid data for analysis and test the hypotheses, a self-designed survey questionnaire was developed as the major instrument for this study. The steps which were addressed are as follows:

Instrument development

A draft of survey items was developed, mainly from a literature review of tech-prep and articulation programs that had already been developed and implemented. Some items of the attitude scale developed by Pollard (1990) were included to cover this aspect. Some items were also developed as the result of the researcher's contact with tech-prep persons at the National Tech Prep Network Fall Conference on September 26-28,1993, in Atlanta, Georgia.

The instrument consisted of two parts. Part I of the survey instrument contained the title page and elicited the required demographic information from the respondents. Each respondent indicated the position title, school level, educational level, years of teaching/ administrative experience, and number of in-service training activities attended (between 1990 and 1993).

Part II of the survey instrument included 40 items divided into four sections to deal with the four categories of tech-prep programs. Ten questions addressed philosophical issues. Ten questions dealt with the administrative issues. Ten questions addressed curriculum issues, and ten questions dealt with the barrier issues. Respondents were requested to rate each of the statements listed in part II on a seven-point Likert-type scale, with 1 = strongly disagree (SD); 2 = disagree (D); 3 = moderately disagree (MD); 4 = neutral (N); 5 = moderately agree (MA); 6 = agree (A); and 7 = strongly agree (SA). Also, an additional area was provided for the respondents to express their comments.

Validation and pilot test

"Validity . . . refers to the appropriateness, meaningfulness, and usefulness of the specific inferences made from test scores. Test validation is the process of accumulating evidence to support such inferences" (American Psychological Association et al., 1985, p. 9). Content validity of an instrument is of concern in the descriptive research method. Content validity is evaluated by showing how well the content of the test samples the class of situations or subject matter about which conclusions are to be drawn (APA et al., 1966; Cronbach, 1971; Messick, 1975). Messick (1975) stated that, "Content validity gives every appearance of being a fixed property of the test . . . rather than being a property of test responses" (p. 959). Kerlinger (1979) stated, "Content validity is thus, closely related to the question: Are you measuring what you think you are measuring" (p. 139). Ebel (1966) stated ". . . the simplest and most direct evidence of content validity is obtained from examination of the test itself by a competent judge" (p. 97). Based on the preceding statements, it is obvious that content validity is very important in developing the instrument.

The following steps were undertaken to validate the instrument used in this study. First, the survey instrument was critiqued by participants of the National Tech Prep Network Fall Conference on September 26-28, 1993, in Atlanta, Georgia. Their comments were incorporated to improve the content validity of this instrument. Then a revised survey instrument was sent to 14 persons who were tech-prep teachers/instructors/administrators at secondary and postsecondary schools, directors/coordinators at tech-prep programs/consortia, and a project manager/researcher at an evaluation and training institute to conduct the pilot test. Eleven of these persons reviewed and modified the questionnaire. Their suggestions were included in the final revision of the survey instrument.

Reliability of the instrument

The reliability of a survey instrument may be defined as ". . . the level of internal consistency or stability of the measuring device over time" (Borg & Gall, 1989, p. 257). The coefficient of reliability is expressed from 0.00 to 1.00. Reliability is often measured by using Cronbach's coefficient alpha in the Statistical Analysis System (SAS) Package. Cronbach's coefficient alpha is the average of split-half reliability (Bryman & Cramer, 1990). When the reliability coefficient is greater than 0.65, it can be considered to be satisfactory to the study (Aiken, 1982; Mehrens and Lehmann, 1978; Nunnally, 1982). If reliability coefficients are equal or greater than 0.85, it indicates a high degree of reliability (Chase, 1978).

A reliability analysis was undertaken in the study in four areas: philosophy, administration, curriculum, and barriers. The results of the entire and each section reliability are reported in Tables A.1 - A.5 (see Appendix A). The reliability coefficients of entire section, philosophy, administration, curriculum, and barriers were 0.89, 0.71, 0.73, 0.80, and 0.88, respectively. After factor analysis, however, the reliability coefficients of new variables were: curriculum (.88), and administration (.92), shown in Tables A.6 - A.7 (see Appendix A).

Data Collection

In order to gather data for this study, it was necessary to obtain permission from the University Committee on the Use of Human Subjects Research at Iowa State University (see Appendix B). The data was then collected through a structured questionnaire. The initial mailing was conducted on November 8, 1993. Participants received a survey instrument and a cover letter requesting their voluntary participation and explaining the purpose of the survey. Copies of the cover letter and survey instrument are found in Appendix C. Each survey instrument was coded with an identified number for contacting non-respondents from this mailing. A follow-up mailing was sent to non-respondents with a second copy of the survey instrument and a follow-up letter on December 2, 1993 (see Appendix D).

The deadline for the return of the completed survey instrument was December 31, 1993. A total of 159 of the 200 questionnaires were returned, for an overall response rate of 79.5 percent in this study. Responses to individual items are shown in Table 3.1. The best return rates were from the States of Wisconsin and North Carolina.

The returned questionnaires were reviewed for missing data and entered into the mainframe computer at Iowa State University's Computation Center with the following format as shown in Table 3.2.

Data Analysis

The data analysis included an examination of the demographic data and the testing of hypotheses. Descriptive statistics were employed on all variables in the total sample to obtain demographic data to study the distribution of variables. However, when the collected data were subjected to factor analysis, the four dependent variables were classified into two new categories called curriculum (including philosophy) and administration (including barriers) in this study, because of their high correlation with one another. The Statistical Analysis System (SAS) was used to analyze the data in the study.

The following statistical procedures were used to analyze the data:

- Factor analysis was used to perform a variety of common factor and component analyses and rotations. Two new factors, curriculum and administration, emerged and were used in this study.
- Frequency counts and percentages were used to summarize descriptive data.
- Mean scores were computed for all demographic variables in the study and also for all items related to each research hypothesis.
- Standard deviations were computed for the demographic factors and for all items.
- Independent t-tests were used to test the difference between the means of two groups of samples.

Table 3.1. Mailing and response of the questionnaires

State	No. Sent	No. Returned	Response Rate (%)
Illinois	20	14	70
Indiana	20	14	70
Maryland	20	19	95
Michigan	20	15	75
North Carolina	20	20	100
Oregon	20	17	85
Pennsylvania	20	16	80
South Carolina	20	12	60
Virginia	20	12	60
Wisconsin	20	20	100
Total	200	159	79.5

Response Rate = (No. Returned/No. Sent) x 100%

Table 3.2. Coding format

Item	Column No.
Code no.	1-3
Position title	5
School level	6
Educational level	7
Years of teaching experience	8
Years of administrative experience	9
Number of in-service training activities attended	10-19
Philosophy of tech-prep	21-30
Administration of tech-prep	31-40
Curriculum of tech-prep	41-50
Barriers of tech-prep	51-60

- Analysis of variance (ANOVA): One-way ANOVA was used to analyze one dependent variable at two or more levels. Two-way ANOVA was conducted to analyze the interaction between two demographic factors to one dependent variable at two or more levels.
- Post-hoc Duncan's multiple range test was used to verify differences and to identify specific groups whenever significant differences beyond the assigned probability level of .05 were found for F-values among groups.
- Pearson product moment correlation coefficient was used to test the correlation between more or fewer numbers of in-service training activities attended toward tech-prep programs.
- Reliability analysis (Cronbach's alpha) was conducted to establish the internal consistency of each survey section and of the entire instrument.

CHAPTER IV. RESULTS

This study was undertaken to obtain a better understanding tech-prep teachers' and administrators' attitudes toward current tech-prep programs implemented in secondary and postsecondary schools. The results and major findings of the statistical analyses used to test the hypotheses of the study are presented in this chapter. The chapter is organized into the following sections: (1) General Characteristics of the Sample; (2) Factor Analysis; (3) Results of Hypotheses Testing; (4) Findings; and (5) Summary.

General Characteristics of the Sample

This section describes the demographic characteristics of the respondents. The following independent variables were described: (1) position title–a) teacher and b) administrator; (2) school level–a) secondary school and b) postsecondary school; (3) highest educational level obtained; (4) years of teaching/administrative experience; and (5) number of in-service training activities attended. Frequency distributions and t-test were used to present these information. The mean, standard deviation for the items are shown in Tables 4.1 - 4.4.

Position title

Position title includes tech-prep teachers and administrators who participated in this study. Tech-prep teachers' and administrators' frequency distribution in secondary and postsecondary school levels are shown in Table 4.5. The percentage of teacher respondents was 47.17% from secondary school level and 18.24% from postsecondary school level. The

Table 4.1. Mean and standard deviation for philosophical issues

Philosophical issues	N	Mean	Standard deviation
1. Tech-prep programs reduce the dropout rate in high schools better than other programs.	156	5.32	1.12
2. Tech-prep programs provide sufficient preparation for employment in the "technological" jobs of the future.	157	5.38	1.38
3. Tech-prep programs should be designed primarily for the general education students.	157	3.52	1.94
4. Tech-prep programs will prepare students for any level of education.	158	5.06	1.71
5. Tech-prep programs can link high school school and community college programs, eliminating "gap" and "overlaps".	159	6.33	0.81
6. Teachers and administrators should attend in-service training regarding tech-prep programs to help them communicate with each other.	159	6.52	0.68
7. Business/industry should jointly develop and implement tech-prep programs with schools.	158	6.50	0.76
8. Tech-prep programs could help meet the employment needs as required by business/industry.	159	6.22	0.91
9. It is necessary to establish follow-up programs on graduates of my school for feedback or suggestions to strengthen tech-prep programs.	159	6.30	0.83
10. Tech-prep programs should be designed to have flexibility for individual differences of students.	158	6.03	1.15

Scale used: 1 = strongly disagree; 2 = disagree; 3 = moderately disagree; 4 = neutral; 5 = moderately agree; 6 = agree; 7 = strongly agree

Table 4.2. Mean and standard deviation for administrative issues

Administrative issues	N	Mean	Standard deviation
11. Modifications of the existing facilities at my school/schools would be necessary for implementation of tech-prep programs.	156	4.12	1.96
12. A tech-prep program would be a good recruiting tool for my school/schools.	159	5.72	1.12
13. Teachers/administrators have enough opportunities to attend in-service training related to tech-prep programs in my school/schools.	159	4.24	1.92
14. Tech-prep programs are good public relation tools for my school/schools.	158	5.87	0.88
15. My administrator/faculty supports the implementation of tech-prep programs.	158	5.84	1.08
16. There is a strong administrative leadership in my school/schools to support the implementation of tech-prep programs.	159	5.72	1.35
17. There is appropriate planning to implement tech-prep programs in my school/schools.	159	4.88	1.64
18. I am satisfied with the current articulation agreements in my school/schools	158	4.82	1.57
19. There are sufficient resources provided within my school/schools to provide tech-prep students personal guidance and counseling services.	158	4.18	1.73
20. It is reasonable to let tech-prep students enter, exit, or change programs at any time.	159	4.25	1.64

Scale used: 1 = strongly disagree; 2 = disagree; 3 = moderately disagree;
4 = neutral; 5 = moderately agree; 6 = agree; 7 = strongly agree

Table 4.3. Mean and standard deviation for curriculum issues

Curriculum issues	N	Mean	Standard deviation
21. Tech-prep programs could reduce duplication of courses for the students.	157	5.48	1.24
22. The current curriculum of tech-prep programs have reflected real-world applications in both vocational and academic courses in my school/schools.	153	5.26	1.30
23. Tech-prep programs are a good way to prepare youth for their transition from high school to postsecondary institutions.	158	6.03	1.04
24. It is necessary to have regular curriculum advisory committees to review, modify or revise my tech-prep curriculum.	159	6.05	0.93
25. Tech-prep programs are a good beginning in preparing students for workforce readiness.	159	6.36	0.76
26. Tech-prep programs provide a valuable alternative to college-prep programs.	159	6.04	1.32
27. Tech-prep programs could be an improvement over general/academic education programs	158	6.32	0.95
28. Tech-prep programs will overcome the inadequacies of the current education curriculum.	158	4.80	1.34
29. With the advent of tech-prep programs, guidance counselors will require additional training in vocational guidance.	159	6.04	1.08
30. Tech-prep programs have integrated vocational and academic curriculum in secondary and postsecondary schools.	158	5.40	1.27

Scale used: 1 = strongly disagree; 2 = disagree; 3 = moderately disagree; 4 = neutral; 5 = moderately agree; 6 = agree; 7 = strongly agree

Table 4.4. Mean and standard deviation for barriers issues

Barriers issues	N	Mean	Standard deviation
31. There is a lack of faculty communication between secondary and postsecondary schools in my school/schools.	159	3.51	1.90
32. There is a lack of communication between administrators and teachers within my school/schools.	158	4.20	1.89
33. There is a lack of communication between secondary/postsecondary schools and business/industry in my school/schools	159	3.64	1.77
34. There is a lack of knowledge for faculty to make changes in my school/schools.	158	3.96	1.78
35. There is a lack of funding to buy equipment and materials in my school/schools.	159	2.82	1.84
36. There is a lack of teachers' in-service training opportunities regarding tech-prep programs in my school/schools.	157	3.99	1.93
37. There is a lack of administrators' in-service training opportunities regarding tech-prep programs in my school/schools.	157	4.11	1.78
38. "Turfism" is a problem in implementing a tech-prep programs in my school/schools.	158	3.55	1.91
39. The concept of tracking is a problem to the implementation of tech-prep programs in my school/schools.	158	3.86	1.79
40. My administrator/faculty resists the implementation of tech-prep programs in my school/schools.	158	5.37	1.53

Scale used: 1 = strongly disagree; 2 = disagree; 3 = moderately disagree;
4 = neutral; 5 = moderately agree; 6 = agree; 7 = strongly agree

Table 4.5. Distribution of tech-prep teacher and administrator

School level	Position title	Frequency	Percent
Secondary school	Tech-prep teacher	75	47.17
	Administrator	38	23.90
Postsecondary school	Tech-prep teacher	29	18.24
	Administrator	17	10.69

total response rate for teachers was 65.41%. In addition, the percentage of administrator respondents was 23.90% from secondary school level and 10.69% from postsecondary school level. The total response rate for administrators was 34.59%. Additional statistical tables of mean, standard deviation, and t-probability for the items for each dependent variable by tech-prep teachers and administrators are as shown in Tables E.1 - E.4 (see Appendix E).

School level

Secondary and postsecondary schools were included in the school level variable in this study. The frequency distribution of secondary and postsecondary schools from the respondents is shown in Table 4.6. The response rate of the secondary school level was 71.07%. Additionally, the response rate of postsecondary school level was 28.93%. In addition, the mean, standard deviation, and t-probability for the items for each dependent variable by secondary and postsecondary schools are as shown in Tables E.5 - E.8 (see Appendix E).

Table 4.6. Distribution of secondary and postsecondary schools

Position title	School level	Frequency	Percent
Tech-prep teacher	Secondary school	75	47.17
	Postsecondary school	29	18.24
Administrator	Secondary school	38	23.90
	Postsecondary school	17	10.69

Highest educational level obtained

The distribution of respondents' educational level is presented in Table 4.7 and is as follows: less than BS degree (4.40%); bachelors degree (18.87%); masters degree (26.42%); masters + 30 (38.99%); and doctorate degree (11.32%). The largest portion of the respondents held a masters or masters + 30 (65.41%). The second largest group held a bachelors degree, while the third largest group held a doctorate degree. The smallest group of the respondents held less than a bachelors degree.

Table 4.7. Distribution of highest educational level

Educational level	Tech-prep teacher	Administrator	Secondary school	Postsecondary school	Frequency	Percent
Less than BS	7	0	6	1	7	4.40
Bachelors	27	3	26	4	30	18.87
Masters	28	14	26	16	42	26.42
Masters+30	33	29	50	12	62	38.99
Doctorate	9	9	5	13	18	11.32

Mean = 3.34
SD = 1.05

Furthermore, the educational level of tech-prep teachers having a masters degree or above was 67.31%. Administrators having a masters degree or above were 94.55%. There were 71.68% with a masters degree or above in the secondary school level. There were 89.13% with a masters degree or above in the postsecondary school level.

Years of teaching/administrative experience

The distribution of teaching experience of respondents among tech-prep teachers is shown in Table 4.8. The largest portion of respondents (32.69%) had over 21 years of teaching experience. The second largest group had teaching experience between 16 and 20 years (23.08%). The third largest group had teaching experience between 6 and 10 years (19.23%), while the teaching experience of the fourth group of respondents (13.46%) was between 11 and 15 years. The smallest group of respondents had teaching experience between 1 and 5 years (11.54%). Approximately 55% of the respondents had more than 15 years of teaching experience. However, the administrative experience of respondents from administrators is shown in Table 4.9. Each response rate is shown as follows: 41.82% (1-5

Table 4.8. Distribution of years of teaching experience from tech-prep teachers

Years	Secondary school	Postsecondary school	Tech-prep teacher	Frequency	Percent
1 - 5 years	9	3	12	12	11.54
6 - 10 years	16	4	20	20	19.23
11 - 15 years	9	5	14	14	13.46
16 - 20 years	16	8	24	24	23.08
over 21 years	25	9	34	34	32.69

Mean = 3.53 SD = 1.38

Table 4.9. Distribution of years of administrative experience from administrators

Years	Secondary school	Postsecondary school	Administrator	Frequency	Percent
1 - 5 years	18	5	23	23	11.54
6 - 10 years	8	5	13	13	19.23
11 - 15 years	5	3	8	8	13.46
16 - 20 years	5	0	5	5	23.08
over 21 years	2	4	6	6	32.69
Mean = 2.24	SD = 1.38				

years), 23.64% (6-10 years), 14.54% (11-15 years), 9.09% (16-20 years), and 10.91% (more than 21 years). Clearly, most respondents (65.46%) had less than 10 years of administrative experience.

Number of in-service training activities attended

Respondents were asked to tell how many times they attended related in-service training activities relating to tech-prep programs between 1990 and 1993. Table 4.10 shows that the respondents had attended related in-service training activities from 0 to 148 times. The mean and standard deviation of attending in-service training activities were 15.24 and 20.15, respectively. However, 12 respondents did not attend any related in-service training activities between 1990 and 1993.

As presented by the data in Table 4.10, since the distribution of the number of in-service training activities tends toward a positive skewness, the number of in-service training activities was divided into a dichotomy (frequency ≥ 19 or frequency ≤ 4) based on extreme-groups analysis, to test the correlation between tech-prep teachers'/administrators' attitudes toward tech-prep programs and the number of in-service training activities they had attended.

Table 4.10. Distribution of number of in-service training activities attended

Times (1990-1993)	Tech-prep teacher	Administrator	Secondary school	Postsecondary school	Frequency	Percent
0	7	5	8	4	12	7.5
1	3	0	3	0	3	1.9
2	8	4	8	4	12	7.5
3	4	3	3	4	7	4.4
4	7	5	8	4	12	7.5
5	7	2	5	4	9	5.7
6	6	2	7	1	8	5.0
7	7	1	7	1	8	5.0
8	8	2	9	1	10	6.3
9	3	1	3	1	4	2.5
10	3	2	4	1	5	3.1
11	2	1	3	0	3	1.9
12	4	1	4	1	5	3.1
13	3	0	3	0	3	1.9
14	2	1	2	1	3	1.9
15	4	2	6	0	6	3.8
16	1	0	0	1	1	0.6
17	1	1	1	1	2	1.3
18	2	4	5	1	6	3.8
19	2	0	1	1	2	1.3
20	2	1	2	1	3	1.9
22	0	1	1	0	1	0.6
23	1	0	1	0	1	0.6
25	1	0	1	0	1	0.6
26	4	1	2	3	5	3.1
28	1	0	1	0	1	0.6
29	3	0	3	0	3	1.9
30	0	1	1	0	1	0.6
31	0	1	1	0	1	0.6
32	1	1	0	2	2	1.3
34	2	0	0	2	2	1.3
35	1	0	0	1	1	0.6
37	0	2	0	2	2	1.3
38	1	0	1	0	1	0.6
39	1	0	1	0	1	0.6
40	1	2	2	1	3	1.9
44	0	1	0	1	1	0.6
45	0	2	2	0	2	1.3
49	0	1	1	0	1	0.6
50	0	1	0	1	1	0.6
65	0	1	0	1	1	0.6
116	0	2	2	0	2	1.3
148	1	0	1	0	1	0.6

Mean = 15.24 SD = 20.15

Factor Analysis

The Cronbach's alpha intercorrelation coefficients of the four original dependent variables are shown in Table 4.11. The four original dependent variables exhibited a high correlation among one another. Therefore, the Scree Plot of Eigenvalues of Iterated Principal Factor Analysis was produced. The result of the scree plot shown in Figure 4.1, suggested only two factors, curriculum and administration, and these were the factors used in this study. The Cronbach's alpha intercorrelation coefficients of these two new dependent variables are shown in Table 4.12. According to arbitrary standard ($| r | \geq .25$), the r of rotated factor pattern was shown in Table F.1 (see Appendix F). Factor 1 is related to the variable of administration and factor 2 is related to the variable of curriculum shown in Table F.1.

Results of Hypotheses Testing

Overall, the results of all null hypotheses tested are presented as follows:

Hypothesis 1: There is no significant difference between tech-prep teachers' and administrators' attitudes toward tech-prep programs in secondary and postsecondary schools.

Table 4.11. r (α) matrix of four original dependent variables

	Philosophy	Administration	Curriculum	Barriers
Philosophy	(.71)	.33	.61	- .01
Administration		(.73)	.39	.61
Curriculum			(.80)	.16
Barriers				(.88)

α = values of ( ) r = other values

```
E       |
i    10 +
g       |      1
e       |
n       |
v       |       2
a     5 +
l       |
u       |
e       |        3  456
s       |              78901234567 8901
      0 +                              234567890123 4567890
        --------+------+------+------+------+------+------+------+------+-------- Number
                0      5      10     15     20     25     30     35     40
```

Figure 4.1. Scree plot of eigenvalues of iterated principal factor analysis

Table 4.12. r (α) matrix of two new dependent variables

	Curriculum	Administration
Curriculum	(.88)	.14
Administration		(.92)

α = values of ( )   r = other values

Hypothesis 1.1: There is no significant difference between tech-prep teachers' and administrators' attitudes toward the curriculum of tech-prep programs in secondary and postsecondary schools.

First, the two-way ANOVA was utilized to test the interaction between position title and school levels in this hypothesis. Then, testing the significant difference between tech-prep teachers and administrators was conducted. The statistical hypothesis is:

H_o: $\mu_1 = \mu_2$, and

H_a: $\mu_1 \neq \mu_2$

where: μ_1 is the attitude mean of administrators

μ_2 is the attitude mean of tech-prep teachers.

From the data provided in Table 4.13, since Pr > F = 0.73 > α = .05, there was no significant interaction between position title (administrator and tech-prep teacher) and school level (secondary and postsecondary schools). Also, the overall Pr > F = 0.34 > α = .05. Therefore, null Hypothesis 1.1 was retained. It was concluded that there is no significant difference between administrators' and tech-prep teachers' attitudes toward the curriculum of tech-prep programs in secondary and postsecondary schools.

Hypothesis 1.2: There is no significant difference between tech-prep teachers' and administrators' attitudes toward the administration of tech-prep programs in secondary and postsecondary schools.

First, the two-way ANOVA was utilized to test the interaction between position title and school levels in this hypothesis. Then, testing the significant difference between tech-prep

Table 4.13. Test for differences between administrators and tech-prep teachers toward the curriculum of tech-prep programs

Source	df	SS	MS	F-value	Pr > F
Between groups	3	569.76	189.92	1.13	0.34
Position title	1	278.48	278.48	1.66	0.20
School level	1	249.12	249.12	1.48	0.23
Position title*school level	1	19.42	19.42	0.12	0.73
Within groups	143	24,015.83	167.94		
Total	146	24,585.59			

teachers and administrators was conducted. The statistical hypothesis is:

H_o: $\mu_1 = \mu_2$, and

H_a: $\mu_1 \neq \mu_2$

where: μ_1 is the attitude mean of administrators

μ_2 is the attitude mean of tech-prep teachers.

From the data provided in Table 4.14, since $Pr > F = 0.65 > \alpha = .05$, there was no significant interaction between position title (administrator and tech-prep teacher) and school level (secondary and postsecondary schools). Also, the overall $Pr > F = 0.62 > \alpha = .05$. Therefore, null Hypothesis 1.2 was retained. It was concluded that there is no significant difference between administrators' and tech-prep teachers' attitudes toward the administration of tech-prep programs in secondary and postsecondary schools.

Hypothesis 2: There is no significant difference in administrators' attitudes toward tech-prep programs between secondary and postsecondary schools.

Table 4.14. Test for differences between administrators and tech-prep teachers toward the administration of tech-prep programs

Source	df	SS	MS	F-value	Pr > F
Between groups	3	615.17	205.06	0.60	0.62
Position title	1	138.10	138.10	0.40	0.53
School level	1	349.36	349.36	1.02	0.31
Position title*school level	1	68.90	68.90	0.20	0.65
Within groups	150	51,254.37	341.70		
Total	153	51,869.54			

<u>Hypothesis 2.1</u>: There is no significant difference in administrators' attitudes toward the curriculum of tech-prep programs between secondary and postsecondary schools. The independent t-test was utilized to test this hypothesis.

H_o: $\mu_1 = \mu_2$, and

H_a: $\mu_1 \neq \mu_2$

where: μ_1 is the attitude mean of postsecondary schools administrators

μ_2 is the attitude mean of secondary schools administrators.

From the data provided in Table 4.15, since prob-value = .57 > α = .05, the null Hypothesis 2.1 failed to be rejected. It was concluded that administrators' attitudes toward the curriculum of tech-prep programs were not significantly different between secondary and postsecondary schools.

<u>Hypothesis 2.2</u>: There is no significant difference in administrators' attitudes toward the administration of tech-prep programs between secondary and postsecondary schools.

The independent t-test was utilized to test this hypothesis.

H_o: $\mu_1 = \mu_2$, and

H_a: $\mu_1 \neq \mu_2$

where: μ_1 is the attitude mean of postsecondary schools administrators

Table 4.15. Test for differences in administrators' attitudes between secondary and postsecondary schools toward the curriculum of tech-prep programs

School level	N	Mean	SD	t-value	Prob > |t|
Secondary school	35	129.66	11.68	0.57	0.57
Postsecondary school	16	127.50	14.11		

μ_2 is the attitude mean of secondary schools administrators.

From the data provided in Table 4.16, since prob-value = .74 > α = .05, null Hypothesis 2.2 was retained. It was concluded that administrators' attitudes toward the administration of tech-prep programs were not significantly different between secondary and postsecondary schools.

Hypothesis 3: There is no significant difference in tech-prep teachers' attitudes toward tech-prep programs between secondary and postsecondary schools.

Hypothesis 3.1: There is no significant difference in tech-prep teachers' attitudes toward the curriculum of tech-prep programs between secondary and postsecondary schools.

The independent t-test was utilized to test this hypothesis.

H_o: $\mu_1 = \mu_2$, and

H_a: $\mu_1 \neq \mu_2$

where: μ_1 is the tech-prep teachers' mean in postsecondary schools

μ_2 is the tech-prep teachers' mean in secondary schools.

From the data provided in Table 4.17, since prob-value = 0.29 > α = .05, null Hypothesis 3.1 was retained. It was concluded that administrators' attitudes toward the

Table 4.16. Test for differences in administrators' attitudes between secondary and postsecondary schools toward the administration of tech-prep programs

School level	N	Mean	SD	t-value	Prob > |t|
Secondary school	38	70.32	19.34	0.33	0.74
Postsecondary school	16	68.38	20.78		

curriculum of tech-prep programs were not significantly different between secondary and postsecondary schools.

Hypothesis 3.2: There is no significant difference in tech-prep teachers' attitudes toward the administration of tech-prep programs between secondary and postsecondary schools.

The independent t-test was utilized to test this hypothesis.

H_o: $\mu_1 = \mu_2$, and

H_a: $\mu_1 \neq \mu_2$

where: μ_1 is the tech-prep teachers' mean in postsecondary schools

μ_2 is the tech-prep teachers' mean in secondary schools.

From the data provided in Table 4.18, since prob-value = 0.21 > α = .05, null Hypothesis 3.2 was retained. It was concluded that the attitudes of administrators toward the administration of tech-prep programs were not significantly different between secondary and postsecondary schools.

Hypothesis 4: There is no significant difference between administrators' and tech-prep teachers' attitudes toward tech-prep programs in secondary schools.

Table 4.17. Test for differences in tech-prep teachers' attitudes between secondary and postsecondary schools toward the curriculum of tech-prep programs

School level	N	Mean	SD	t-value	Prob > |t|
Secondary school	70	127.33	11.67	1.07	0.29
Postsecondary school	26	123.50	16.72		

Table 4.18. Test for differences in tech-prep teachers' attitudes between secondary and postsecondary schools toward the administration of tech-prep programs

School level	N	Mean	SD	t-value	Prob > |t|
Secondary school	73	69.67	17.20	1.26	0.21
Postsecondary school	27	64.63	19.24		

Hypothesis 4.1: There is no significant difference between administrators' and tech-prep teachers' attitudes toward the curriculum of tech-prep programs in secondary schools.

The independent t-test was used to test this hypothesis.

H_o: $\mu_1 = \mu_2$, and

H_a: $\mu_1 \neq \mu_2$

where: μ_1 is the attitudes mean of secondary school administrators

μ_2 is the attitudes mean of secondary school tech-prep teachers.

From the data provided in Table 4.19, since prob-value = 0.34 > α = .05, the null Hypothesis 4.1 failed to be rejected. It was concluded that the attitudes of administrators and tech-prep teachers toward the curriculum of tech-prep programs was not significantly different in secondary schools.

Table 4.19. Test for differences between administrators' and tech-prep teachers' attitudes in secondary schools toward the curriculum of tech-prep programs

Position title	N	Mean	SD	t-value	Prob > |t|
Tech-prep teacher	70	127.33	11.67	- 0.96	0.34
Administrator	35	129.66	11.68		

Hypothesis 4.2: There is no significant difference between administrators' and tech-prep teachers' attitudes toward the administration of tech-prep programs in secondary schools.

The independent t-test was used to test this hypothesis.

H_o: $\mu_1 = \mu_2$, and

H_a: $\mu_1 \neq \mu_2$

where: μ_1 is the attitudes mean of secondary school administrators

μ_2 is the attitudes mean of secondary school tech-prep teachers.

From the data provided in Table 4.20, since prob-value = 0.86 > α = .05, null Hypothesis 4.2 was retained. It was concluded that the attitudes of administrators and tech-prep teachers toward the administration of tech-prep programs in secondary schools were not significantly different.

Hypothesis 5: There is no significant difference between administrators' and tech-prep teachers' attitudes toward tech-prep programs in postsecondary schools.

Hypothesis 5.1: There is no significant difference between administrators' and tech-prep teachers' attitudes toward the curriculum of tech-prep programs in postsecondary schools.

Table 4.20. Test for differences between administrators' and tech-prep teachers' attitudes in secondary schools toward the administration of tech-prep programs

Position title	N	Mean	SD	t-value	Prob > |t|
Tech-prep teacher	73	69.67	17.20	- 0.18	0.86
Administrator	38	70.32	19.34		

The independent t-test was used to test this hypothesis.

H_o: $\mu_1 = \mu_2$, and

H_a: $\mu_1 \neq \mu_2$

where: μ_1 is the attitudes mean of postsecondary school administrators

μ_2 is the attitudes mean of postsecondary school tech-prep teachers.

From the data provided in Table 4.21, since prob-value = 0.43 > α = .05, the null Hypothesis 5.1 failed to be rejected. It was concluded that the attitudes of administrators and tech-prep teachers toward the curriculum of tech-prep programs were not significantly different in postsecondary schools.

Hypothesis 5.2: There is no significant difference between administrators' and tech-prep teachers' attitudes toward the administration of tech-prep programs in postsecondary schools.

The independent t-test was used to test this hypothesis.

H_o: $\mu_1 = \mu_2$, and

H_a: $\mu_1 \neq \mu_2$

where: μ_1 is the attitudes mean of postsecondary school administrators

μ_2 is the attitudes mean of postsecondary school tech-prep teachers.

From the data provided in Table 4.22, since prob-value = 0.55 > α = .05, null Hypothesis 5.2 was retained. It was concluded that the attitudes of administrators and tech-prep teachers toward the administration of tech-prep programs were not significantly different in postsecondary schools.

Table 4.21. Test for differences between administrators' and tech-prep teachers' attitudes in postsecondary schools toward the curriculum of tech-prep programs

Type	N	Mean	SD	t-value	Prob > |t|
Tech-prep teacher	26	123.50	16.72	- 0.80	0.43
Administrator	16	127.50	14.11		

Table 4.22. Test for differences between administrators' and tech-prep teachers' attitudes in postsecondary schools toward the administration of tech-prep programs

Type	N	Mean	SD	t-value	Prob > |t|
Tech-prep teacher	27	64.63	19.24	- 0.60	0.55
Administrator	16	68.38	20.78		

<u>Hypothesis 6</u>: There is no significant difference in attitudes toward tech-prep programs, as demonstrated between secondary and postsecondary schools by tech-prep teachers who had higher educational levels as compared to those with lower educational levels.

<u>Hypothesis 6.1</u>: There is no significant difference in attitudes toward the curriculum of tech-prep programs, as demonstrated between secondary and postsecondary schools by tech-prep teachers who had higher educational levels as compared to those with lower educational levels.

The one-way ANOVA was utilized in testing this hypothesis. The statistical hypothesis is:

H_o: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$, and

H_a: at least two μ's are different.

where: μ_1 is the attitude mean of tech-prep teachers having less than BS degrees

μ_2 is the attitude mean of tech-prep teachers with bachelors degrees

μ_3 is the attitude mean of tech-prep teachers with masters degrees

μ_4 is the attitude mean of tech-prep teachers with masters + 30 credits, and

μ_5 is the attitude mean of tech-prep teachers with doctorate degrees.

The data for this hypothesis are shown in Table 4.23. Results from Table 4.23, show that $Pr = .008 < \alpha = .05$, and therefore Hypothesis 6.1 was rejected. It was concluded that the attitudes of tech-prep teachers at five educational levels were significantly different between secondary and postsecondary schools toward the curriculum of tech-prep programs. Therefore, a post-hoc Duncan's multiple range test was used to test the significant differences among educational levels. The results of Duncan's multiple range test is shown in Table 4.24. There were significant differences between respondents with a doctorate degree and other educational levels.

Hypothesis 6.2: There is no significant difference in attitudes toward the administration of tech-prep programs, as demonstrated between secondary and postsecondary schools by tech-prep teachers who had higher educational levels as compared to those with

Table 4.23. ANOVA on tech-prep teachers' attitudes by educational level toward the curriculum of tech-prep programs

Source	df	SS	MS	F-value	Pr > F
Educational level	4	2,342.80	585.70	3.72 **	0.008
Error	91	14,325.04	157.42		
Total	95	16667.83			

** p < .01

Table 4.24. Means and one-way ANOVA on tech-prep teachers' attitudes by educational level toward the curriculum of tech-prep programs

Factor	Mean					F-value	Pr > F	Duncan's
	1[a]	2	3	4	5			
curriculum	5.62	5.92	5.78	5.78	5.09	3.72**	0.008	1,2,3,4 > 5
Administration	4.71	4.45	4.07	4.24	4.13	0.68	0.61	

** $p < .01$ [a] Educational levels: 1 = less than BS; 2 = bachelors; 3 = masters; 4 = masters+30; 5 = doctorate

lower educational levels.

The one-way ANOVA was utilized in testing this hypothesis. The statistical hypothesis is:

H_o: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$, and

H_a: at least two μ's are different.

where: μ_1 is the attitude mean of tech-prep teachers having less than BS degrees

μ_2 is the attitude mean of tech-prep teachers with bachelors degrees

μ_3 is the attitude mean of tech-prep teachers with masters degrees

μ_4 is the attitude mean of tech-prep teachers with masters + 30 credits, and

μ_5 is the attitude mean of tech-prep teachers with doctorate degrees.

The data for this hypothesis are shown in Table 4.25. Since $Pr = .61 > \alpha = .05$, Hypothesis 6.2 was retained. It was concluded that the attitudes of tech-prep teachers at five educational levels were not significantly different between secondary and postsecondary schools toward the administration of tech-prep programs.

Table 4.25. ANOVA on tech-prep teachers' attitudes by educational level toward the administration of tech-prep programs

Source	df	SS	MS	F-value	Pr > F
Educational level	4	876.45	219.11	0.68	0.61
Error	95	30,554.94	321.63		
Total	99	31,431.39			

Hypothesis 7: There is no significant difference in attitudes toward tech-prep programs, as demonstrated between secondary and postsecondary schools by administrators who had higher educational levels as compared to those with lower educational level.

Hypothesis 7.1: There is no significant difference in attitudes toward the curriculum of tech-prep programs, as demonstrated between secondary and postsecondary schools by administrators who had higher educational levels as compared to those with lower educational level.

The one-way ANOVA was also used to test this hypothesis. The statistical hypothesis is:

H_o: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$, and

H_a: at least two μ's are different.

where: μ_1 is the attitude mean of administrators having less than BS degrees

μ_2 is the attitude mean of administrators with bachelors degrees

μ_3 is the attitude mean of administrators with masters degrees

μ_4 is the attitude mean of administrators with masters + 30 credits, and

μ_5 is the attitude mean of administrators with doctorate degrees.

From the data shown in Table 4.26, since Pr = .04 < α = .05, Hypothesis 7.1 was rejected. It was concluded that the attitudes of administrators at five educational levels were significantly different between secondary and postsecondary schools toward the curriculum of tech-prep programs. Therefore, the Duncan's post-hoc multiple range test was used to test the significant differences among educational levels. The result of Duncan's test are presented in Table 4.27. There were significant differences between respondents with masters vs. bachelors degrees and respondents with masters + 30 credits vs. bachelors degrees.

Hypothesis 7.2: There is no significant difference in attitudes toward the administration of tech-prep programs, as demonstrated between secondary and postsecondary schools by administrators who had higher educational levels as compared to those with lower educational level.

The one-way ANOVA was also used to test this hypothesis. The statistical hypothesis is:

H_o: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$, and

H_a: at least two μ's are different.

Table 4.26. ANOVA on administrators' attitudes by educational level toward the curriculum of tech-prep programs

Source	df	SS	MS	F-value	Pr > F
Educational level	3	1,246.82	415.61	3.04 *	0.04
Error	47	6,430.16	136.81		
Total	50	7,676.98			

* p < .05

Table 4.27. Means and one-way ANOVA on administrators attitudes by educational level toward the curriculum of tech-prep programs

Factor	Mean						
	2[a]	3	4	5	F-value	Pr > F	Duncan's
curriculum	5.15	6.01	5.96	5.62	3.04*	0.04	3, 4 > 2
Administration	3.71	4.63	4.32	4.300.50	0.68		

* $p < .05$ [a] Educational levels: 2 = bachelors; 3 = masters; 4 = masters+30; 5 = doctorate

where: μ_1 was the attitude mean of administrators having less than BS degrees

μ_2 was the attitude mean of administrators with bachelors degrees

μ_3 was the attitude mean of administrators with masters degrees

μ_4 was the attitude mean of administrators with masters + 30 credits, and

μ_5 was the attitude mean of administrators with doctorate degrees.

From the data shown in Table 4.28, since $Pr = .68 > \alpha = .05$, Hypothesis 7.2 was retained. It was concluded that the attitudes of administrators at five educational levels were not significantly different between secondary and postsecondary schools toward the administration of tech-prep programs.

Table 4.28. ANOVA on administrators' attitudes by educational level toward the administration of tech-prep programs

Source	df	SS	MS	F-value	Pr > F
Educational level	3	597.01	199.00	0.50	0.68
Error	50	19,769.36	395.39		
Total	53	20,366.37			

Hypothesis 8: There is no significant difference in attitudes toward tech-prep programs, as demonstrated between secondary and postsecondary schools by tech-prep teachers who had more years of teaching experience as compared to those with fewer years of teaching experience.

Hypothesis 8.1: There is no significant difference in attitudes toward the curriculum of tech-prep programs, as demonstrated between secondary and postsecondary schools by tech-prep teachers who had more years of teaching experience as compared to those with fewer years of teaching experience.

The one-way ANOVA was utilized to test this hypothesis. The statistical hypothesis is:

H_o: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$, and

H_a: at least two μ's are different.

where: μ_1 is the attitude mean of tech-prep teachers with 1-5 years teaching experience

μ_2 is the attitude mean of tech-prep teachers with 6-10 years teaching experience

μ_3 is the attitude mean of tech-prep teachers with 11-15 years teaching experience

μ_4 is the attitude mean of tech-prep teachers with 16-20 years teaching experience, and

μ_5 is the attitude mean of tech-prep teachers with more than 21 years teaching experience

From the data shown in Table 4.29, since $Pr = .87 > \alpha = .05$, Hypothesis 8.1 was retained. It was concluded that the attitudes of administrators at five educational levels were not significantly different between secondary and postsecondary schools toward the curriculum of tech-prep programs.

Hypothesis 8.2: There is no significant difference in attitudes toward the administration of tech-prep programs, as demonstrated between secondary and postsecondary schools by tech-prep teachers who had more years of teaching experience as compared to those with fewer years of teaching experience.

The one-way ANOVA was utilized to test this hypothesis. The statistical hypothesis is:

H_o: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$, and

H_a: at least two μ's are different.

where: μ_1 is the attitude mean of tech-prep teachers with 1-5 years teaching experience

μ_2 is the attitude mean of tech-prep teachers with 6-10 years teaching experience

μ_3 is the attitude mean of tech-prep teachers with 11-15 years teaching experience

Table 4.29. ANOVA on tech-prep teachers' attitudes by teaching experience toward the curriculum of tech-prep programs

Source	df	SS	MS	F-value	Pr > F
Teaching experience	4	220.60	55.15	0.31	0.87
Error	91	16,447.23	180.74		
Total	95	16,667.83			

μ_4 is the attitude mean of tech-prep teachers with 16-20 years teaching experience, and

μ_5 is the attitude mean of tech-prep teachers with more than 21years teaching experience

From the data showed in Table 4.30, since Pr = .70 > α = .05, Hypothesis 8.2 failed to be rejected. It was concluded that the attitudes of administrators at five educational levels were not significantly different between secondary and postsecondary schools toward the administration of tech-prep programs.

Table 4.30. ANOVA on tech-prep teachers' attitudes by teaching experience toward the administration of tech-prep programs

Source	df	SS	MS	F-value	Pr > F
Teaching experience	4	716.87	179.22	0.55	0.70
Error	95	30,714.52	323.31		
Total	99	31,431.39			

Hypothesis 9: There is no significant difference in attitudes toward tech-prep programs, as demonstrated between secondary and postsecondary schools by administrators who had more years of administrative experience as compared to those with fewer years of administrative experience.

Hypothesis 9.1: There is no significant difference in attitudes toward the curriculum of tech-prep programs, as demonstrated between secondary and postsecondary schools by administrators who had more years of administrative experience as compared to those with fewer years of administrative experience.

The one-way ANOVA was used to test this hypothesis. The statistical hypothesis is:

H_o: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$, and

H_a: at least two μ's are different.

where: μ_1 is the attitude mean of administrators with 1-5 years administrative experience

μ_2 is the attitude mean of administrators with 6-10 years administrative experience

μ_3 is the attitude mean of administrators with 11-15 years administrative experience

μ_4 is the attitude mean of administrators with 16-20 years administrative experience, and

μ_5 is the attitude mean of administrators with more than 21years administrative experience

. From the data shown in Table 4.31, since Pr = .33 > α = .05, Hypothesis 9.1 was retained. It was concluded that the attitudes of administrators at five educational levels were not significantly different between secondary and postsecondary schools toward the curriculum of tech-prep programs.

Hypothesis 9.2: There is no significant difference in attitudes toward the administration of tech-prep programs, as demonstrated between secondary and postsecondary schools by administrators who had more years of administrative experience as compared to those with fewer years of administrative experience.

The one-way ANOVA was used to test this hypothesis. The statistical hypothesis is:

H_o: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$, and

H_a: at least two μ's are different.

where: μ_1 is the attitude mean of administrators with 1-5 years administrative experience

μ_2 is the attitude mean of administrators with 6-10 years administrative experience

Table 4.31. ANOVA on administrators' attitudes by administrative experience toward the curriculum of tech-prep programs

Source	df	SS	MS	F-value	Pr > F
Administrative experience	4	717.12	179.28	1.18	0.33
Error	46	6,959.86	151.30		
Total	50	7,676.98			

μ_3 is the attitude mean of administrators with 11-15 years administrative experience

μ_4 is the attitude mean of administrators with 16-20 years administrative experience, and

μ_5 is the attitude mean of administrators on more than 21 years administrative experience

. From the data shown in Table 4.32, since Pr = .57 > α = .05, Hypothesis 9.2 was retained. It was concluded that the attitudes of administrators at five educational levels were not significantly different between secondary and postsecondary schools toward the administration of tech-prep programs.

Hypothesis 10: There is no significant correlation in attitudes toward tech-prep programs, as demonstrated between secondary and postsecondary schools by tech-prep teachers who had attended a greater number of in-service training activities (between 1990-1993) as compared to those with a fewer number in-service training activities.

Table 4.32. ANOVA on administrators' attitudes by administrative experience toward the administration of tech-prep programs

Source	df	SS	MS	F-value	Pr > F
Administrative experience	4	1,150.34	287.59	0.73	0.57
Error	49	19,216.03	392.16		
Total	53	20,366.37			

Hypothesis 10.1: There is no significant correlation in attitudes toward the curriculum of tech-prep programs, as demonstrated by tech-prep teachers who had attended a greater number of in-service training activities (between 1990-1993) as compared to those with a fewer number of in-service training activities.

The Pearson correlation method was used to test this hypothesis. The statistical hypothesis is:

H_o: $\rho = 0$, and

H_a: $\rho \neq 0$

where: ρ is the population correlation coefficient between attitudes and dichotomies of in-service training activities.

The correlation coefficient between tech-prep teachers' attendance at in-service training activities and their attitudes toward the curriculum of tech-prep programs were $r = .40$ and $p = .006 < .05$). Therefore, null Hypothesis 10.1 was rejected. It was concluded that there was a significant correlation between tech-prep teachers' attendance at in-service training activities and their attitudes toward the curriculum of tech-prep programs. Since $r = .40 > 0$, there is a positive relationship between tech-prep teachers' attendance at in-service training activities and their attitudes toward the curriculum of tech-prep programs.

Hypothesis 10.2: There is no significant correlation in attitudes toward the administration of tech-prep programs, as demonstrated between secondary and postsecondary schools by tech-prep teachers who had attended a greater of in-service training activities (between 1990-1993) as compared to those with a fewer number of in-service training activities.

The Pearson correlation method was used to test this hypothesis. The statistical hypothesis is:

H_o: $\rho = 0$, and

H_a: $\rho \neq 0$

where: ρ is the population correlation coefficient between attitudes and dichotomies of in-service training activities.

The correlation coefficient between tech-prep teachers' attendance at in-service training activities and their attitudes toward the administration of tech-prep programs were also fairly low ($r = .11$) and was not significant at $\alpha = .05$ level ($p = .44 > .05$). Therefore, null Hypothesis 10.2 was retained . It was concluded that there was no significant correlation between tech-prep teachers' attendance at in-service training activities and their attitudes toward the administration of tech-prep programs.

Hypothesis 11: There is no significant correlation in attitudes toward tech-prep programs, as demonstrated between secondary and postsecondary schools by administrators who had attended a greater number of in-service training activities (between 1990-1993) as compared to those with a fewer number of in-service training activities.

Hypothesis 11.1: There is no significant correlation in attitudes toward the curriculum of tech-prep programs, as demonstrated by administrators who had attended a greater number of in-service training activities (between 1990-1993) as compared to those with a fewer number of in-service training activities.

The Pearson correlation method was also used to test this hypothesis. The statistical hypothesis is:

H_o: $\rho = 0$, and

H_a: $\rho \neq 0$

where: ρ is the population correlation coefficient between attitudes and dichotomies of in-service training activities.

The correlation coefficient between administrators' attendance at in-service training activities and their attitudes toward the curriculum of tech-prep programs was $r = .60$ and $p = .0003 < \alpha = .05$. Therefore, null Hypothesis 11.1 was rejected. It was concluded that there was a significant correlation between administrators' attendance at in-service training activities and their attitudes toward the curriculum of tech-prep programs. Since $r = .60 > 0$, there is a positive relationship between tech-prep teachers' attendance at in-service training activities and their attitudes toward the curriculum of tech-prep programs.

<u>Hypothesis 11.2</u>: There is no significant correlation in attitudes toward the administration of tech-prep programs, as demonstrated by administrators who had attended a greater number of in-service training activities (between 1990-1993) as compared to those with a fewer number of in-service training activities.

The Pearson correlation method was also used to test this hypothesis. The statistical hypothesis is:

H_o: $\rho = 0$, and

H_a: $\rho \neq 0$

where: ρ is the population correlation coefficient between attitudes and dichotomies of in-service training activities.

The correlation coefficient between administrators' attendance at in-service training activities and their attitudes toward the administration of tech-prep programs was $r = .25$ and $p = .15 > \alpha = .05$. Therefore, null Hypothesis 11.2 was retained. It was concluded that there was no significant correlation between administrators' attendance at in-service training activities and their attitudes toward the administration of tech-prep programs.

Findings

At the educational level, administrators having a masters or above degree (94.55%) were higher than tech-prep teachers' (67.31%). In addition, there were more masters or above degrees in postsecondary schools (89.13%) than in secondary schools' (71.68%).

There were high correlations among the four original dependent variables (philosophy, administration, curriculum, and barriers). After conducting factor analysis, only two factors were emerged. These two factors, curriculum and administration, were used in this study.

In testing Hypothesis 1.1 and Hypothesis 1.2, there were no significant interactions found between position title and school level. These results simplified the analysis of this study. Excepting Hypothesis 6.1 and Hypothesis 7.1, the statistical analyses of Hypothesis 2 through Hypothesis 9 could not provide evidence to support the other null hypotheses. Indeed, there were significant differences in attitudes toward the curriculum of tech-prep programs, as demonstrated between secondary and postsecondary schools by tech-prep teachers and administrators who had higher educational levels as compared to those with lower educational levels. In the other hand, there was no significant difference between independent variables (position title, school level, teaching/administrative experience) and dependent variables (curriculum and administration of tech-prep programs).

In testing Hypothesis 6.1, there were significant differences in attitudes of tech-prep teachers at five educational levels toward the curriculum of tech-prep programs. Similarly, Hypothesis 7.1 which tested for differences in attitudes of administrators at five educational levels toward the curriculum of tech-prep programs produced the same results.

In testing Hypothesis 10.1 and Hypothesis 10.2, there was a positive correlation between tech-prep teachers' attendance at in-service training activities and their attitudes toward the curriculum of tech-prep programs but there was no significant correlation between tech-prep teachers' attendance at in-service training activities and their attitudes toward the administration of tech-prep programs. In testing Hypothesis 11.1 and 11.2, there was a significant positive correlation between administrators' attendance at in-service training activities and their attitudes toward the curriculum of tech-prep programs. However, there was no significant correlation between administrators' attendance at in-service training activities and their attitudes toward the administration of tech-prep programs. This suggested that, when tech-prep teachers' or administrators' attendance at in-service training activities increased, their attitudes toward tech-prep programs promoted the planning, development, and implementation of tech-prep program curriculum.

Summary

The results of the statistical analysis used in testing the hypotheses of this study were presented in the previous sections. Factor analysis was used to identify the new two factors, curriculum and administration. Two-way ANOVA was used to test the interaction of position title and school level in Hypothesis 1. The independent t-test was used to test Hypothesis 2 and 3 for differences between different levels of position title toward curriculum and administration of tech-prep programs. The independent t-test was also used to test Hypotheses 4 and 5 for differences between different school levels toward the curriculum and the administration of tech-prep programs. One-way ANOVA was used in Hypothesis 6 and Hypothesis 7 to test for differences among different educational levels toward the curriculum and the administration of tech-prep programs, respectively. One-way ANOVA was also used in Hypothesis 8 to test for differences among years of teaching experience of tech-prep teachers toward the curriculum of tech-prep programs. One-way ANOVA was also utilized in Hypothesis 9 to test for differences among years of administrative experience of administrators toward the administration of tech-prep programs. Pearson correlation coefficients were used in Hypothesis 10 and Hypothesis 11 to test the relationships between attendance at in-service training activities and attitudes toward the curriculum and the administration of tech-prep programs, respectively.

In summary, Table 4.33 identifies the results of each hypothesis test. Hypotheses 6.1, 7.1, 10.1, and 11.1 were rejected. Therefore, tech-prep teachers and administrators who obtained a higher educational degree demonstrated more positive attitudes toward the curriculum of tech-prep programs.

Also, administrators and teachers who attended more in-service training activities demonstrated more positive attitudes toward the curriculum of tech-prep programs. The remaining hypotheses in this study failed to be rejected. In other words, there were no significant interaction, differences, or correlations between independent variables and dependent variables in these hypotheses.

Table 4.33: Summary of results for testing the hypotheses

Hypothesis	1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	6.1
Results	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	R

Hypothesis	6.2	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	11.1	11.2
Results	NR	R	NR	NR	NR	NR	NR	R	NR	R	NR

R = Rejected NR = Not Rejected

CHAPTER V. SUMMARY, DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

The first four chapters of this study contained the introduction, the literature review, a description of the methodology, and the data analysis and findings of the study. This chapter presents a summary of the overview for this study, provides discussion, and makes conclusions based on the major findings and results. In addition, recommendations and directions for future research are presented.

Summary of the Study

The tech-prep education program is an alternative to the college preparatory course of study. Tech-prep offers a sequence of postsecondary occupational education leading to a certificate or an associate degree. The programs prepare students for either direct entry into the workplace as technically skilled employees, or continue with further education leading to baccalaureate and/or advanced degrees. Tech-prep is also considered as an important school-to-work transition program model because it helps students make an important connection between school and employment.

To promote competitive ability in the nation's economy and decrease the high school dropout rate, Parnell (1985) introduced the concept of the Tech-Prep/Associate Degree (TPAD) in <u>The Neglected Majority</u>. Articulated education is used to implement tech-prep programs. Although, there are numerous articulation models, tech-prep does not belong solely to any one model. Through tech-prep related programs/credits can be identified and transferred from a secondary school to a postsecondary school by integrating vocational and academic education to provide students with basic workplace entry skills, or to obtain advanced degrees leading to lifelong learning. This is a coordination of articulation education, called vertical articulation. Parnell emphasized ". . . five C's: Continuity in learning, Context-based teaching, Competency-based teaching, Communication between educational institutions, and Completion of the program with an associate degree " (1991, p. 27) to develop TPAD programs. Therefore, the federal legislation, Carl D. Perkins Technology and Applied Education Amendments Act of 1990, was reauthorized to support funds for each state. To date, the new educational reform, tech-prep, has been implemented nationwide in America. In order to implement tech-prep programs successfully, an organizational structure should be established with good communication among all parties to reduce barriers. Finally, a total quality management (TQM) approach should be used to improve the quality of tech-prep programs.

This survey was conducted in twenty secondary schools and twenty postsecondary schools from ten selected states in United States in order to be better understand the implementation of tech-prep programs. The total sample was two hundred, with a response rate of 159 out of 200 or 79.5 percent. After the data collection and coding, testing of the hypotheses was conducted using several statistical methods: factor analysis, independent t-test, one-way and two-way ANOVA, and the Pearson correlation method.

The results of this study indicated that there was no interaction between position title and school level, no differences between tech-prep teachers' and administrators' in the same or different school levels, no differences between educational levels of tech-prep teachers/ administrators and the administration of tech-prep programs, no differences between tech-prep teachers' teaching experience/administrators' administrative experience and the curriculum/administration of tech-prep programs, and no significant correlations between tech-prep teachers' attendance at in-service activities and their attitudes toward curriculum/administration of tech-prep programs.

Discussion

From the results of the statistical analyses, the secondary and postsecondary school tech-prep teachers and administrators were in agreement with the curriculum and administrative concerns. However, these results were not in agreement with Pollard's study (1990), conducted only in postsecondary institutions whose findings revealed that a significant difference did exist between the responses of the university and postsecondary participants in administration and curriculum. This may be due to their own strong tech-prep programs influencing their attitudes. Since the attitudes of tech-prep teachers and administrators in secondary and postsecondary schools were not significantly different, these results will facilitate the implementation of tech-prep programs.

The secondary and postsecondary school administrators were in agreement with curriculum and administrative concerns. Since 94.55% of these administrators had a masters degree or above, this result may be due to their awareness of the purpose of educational reform which is to: reduce the dropout rate in high school; reduce the duplication of courses; obtain an associate degree; and prepare students for employment needs. Maybe, the participants thought tech-prep programs are a good recruiting tool and/or a good public relations tool for their schools. In addition, their attendance at in-service training activities to communicate with persons from other tech-prep program was another factor in agreement with the implementation of tech-prep programs.

The secondary and postsecondary school tech-prep teachers were also in agreement with curriculum and administrative concerns. This result may also be due to their awareness of the purpose of tech-prep programs to the educational reform.

Administrators and tech-prep teachers in secondary schools were in agreement with the curriculum and the administration of tech-prep programs. The result is consistent with several researchers (Feldman, 1988; Ingram & Troyer, 1989; McClure, 1988; Parnell, 1985) to encourage students to pursue an associate degree. A result of developing and implementing tech-prep programs in secondary schools would be a good way to decrease dropout rates and prepare students to meet workforce needs.

The postsecondary school administrators and tech-prep teachers were also in agreement with the curriculum and the administration of tech-prep programs. The result was also consistent with several researchers (Feldman, 1988; Ingram & Troyer, 1989; McClure, 1988; Parnell, 1985) to encourage students to pursue an associate degree. The result of developing and implementing tech-prep programs in postsecondary schools would be a good recruiting tool to increase enrollments.

As to educational levels, there were significant differences between tech-prep teachers with a doctoral degree and those with other educational levels toward the curriculum of tech-prep programs. On the other hand, there were also significant differences between administrators with a masters degree or masters + 30 credits and those with bachelors degree toward the curriculum of tech-prep programs. This suggests that the different educational levels of tech-prep teachers resulted in different viewpoints about developing and implementing the curriculum of tech-prep programs. However, there are no significant differences in tech-prep teachers' or administrators' attitudes toward the administration of tech-prep programs. These results will facilitate the implementation of tech-prep programs. Overall, educational level was one of the main factors in planning, developing, and implementing tech-prep programs in secondary and postsecondary schools.

As to teaching/administrative experience, there were no significant differences in either tech-prep teachers' or administrators' attitudes. They were in agreement with the curriculum and the administration of tech-prep programs.

The finding of significant positive correlations between the number of in-service training activities tech-prep teachers/administrators have attended (between 1990-1993) toward the curriculum of tech-prep programs were in contrast to several research studies (Byler & Williams, 1979; Drier & Bysbers, 1989; Moore, 1983; Petry et al., 1979; Pollard, 1990) which reported a need for additional training in vocational guidance with the implementation of tech-prep programs. In addition, several research studies also reported cost as a barrier to the implementation of tech-prep programs (Farland & Anderson, 1988; Moore, 1983; Woefler, 1978). Furthermore, how to arrange the time and obtain funds are other barriers to in-service training activities.

Therefore, in-service training activities were considered as one of the main factors in implementing tech-prep programs. This may be to communicate with persons interested in tech-prep programs and to alleviate the barriers (e.g., turfism and fear) through in-service training activities to successfully implement tech-prep programs. It seems the more in-service training activities they attended, the more positive attitudes they have toward the curriculum and the administration of tech-prep programs. Attendance at in-service training activities may be a good strategy in planning, developing, and implementing tech-prep programs successfully.

Overall, the goal of tech-prep program is a goal that all students graduate from high school ready for work, ready for postsecondary education, or for both. Administrative support is the key to implementing tech-prep programs and counselors are a key part in ensuring its success.

Conclusions

The major conclusions for this study are as follows:

1. There was no significant interaction between position title (administrator/tech-prep teacher) and school level (secondary school/postsecondary school). Indeed, there were no significant differences in the attitudes of tech-prep teachers and administrators at secondary and postsecondary schools toward the curriculum and the administration of tech-prep programs.

2. There were no significant differences in the attitudes between secondary and postsecondary school administrators toward the curriculum and the administration of tech-prep programs.
3. There were no significant differences in the attitudes between secondary and postsecondary school tech-prep teachers toward the curriculum and the administration of tech-prep programs.
4. There were no significant differences in the attitudes between secondary school administrators and tech-prep teachers toward the curriculum and the administration of tech-prep programs.
5. There were no significant differences in the attitudes between postsecondary school administrators and tech-prep teachers toward the curriculum and the administration of tech-prep programs.
6. There were significant differences in the attitudes of tech-prep teachers at five educational levels toward the curriculum of tech-prep programs at secondary and postsecondary schools. The differences were between respondents with a doctoral degree and those with other educational degree, e.g., less than BS, bachelors degrees, masters degrees, master + 30 credits. However, there were no significant differences in the attitudes of tech-prep teachers at five educational levels toward the administration of tech-prep programs at secondary and postsecondary schools.
7. There were significant differences in the attitudes of administrators at five educational levels toward the curriculum of tech-prep programs at secondary and postsecondary

schools. Particularly, the significant differences were between respondents with a masters degrees and/or masters + 30 credits vs. a bachelors degree. However, there were no significant differences in the attitudes of administrators at five educational levels toward the administration of tech-prep programs at secondary and postsecondary schools.

8. There were no significant differences in the attitudes of tech-prep teachers with different amounts of teaching experience toward the curriculum and the administration of tech-prep programs at secondary and postsecondary schools.
9. There were no significant differences in the attitudes of administrators with different years of administrative experience, toward the curriculum and the administration of tech-prep programs at secondary and postsecondary schools.
10. There was a significant positive correlation in the attitudes of tech-prep teachers' attendance at different number of in-service training activities (between 1990-1993) toward the curriculum of tech-prep programs. However, there was no correlation in the attitudes of tech-prep teachers' attendance at different number of in-service training activities (between 1990-1993) toward the administration of tech-prep programs.
11. There was a significant positive correlation in the attitudes of administrators' attendance at different number of in-service training activities (between 1990-1993) toward the curriculum of tech-prep programs. However, there was no correlation in the attitudes of administrators' attendance at different number of in-service training activities (between 1990-1993) toward the administration of tech-prep programs.

Recommendations

This section contains recommendations to provide guidance for secondary and postsecondary schools, and recommendations for future research.

Recommendations for secondary and postsecondary schools

The tech-prep program is an educational reform currently taking place in America. This study provides a good rationale for the implementation of tech-prep programs in school systems that do not currently employ tech-prep. It could also serve as a model for implementing tech-prep programs in other countries.

Based on the findings of this study, administrators who have attended a greater number of in-service training activities demonstrated more favorable attitudes toward the curriculum (including philosophy) and the administration (including barriers) of tech-prep programs than those who attended a fewer number of in-service training activities. It is recommended that educational authorities hold seminars or conferences to introduce the purposes and strategies for implementing tech-prep programs to educators and faculty in secondary schools and postsecondary schools. It is also recommended that the administrators of secondary and postsecondary schools need to encourage their faculty to attend in-service training activities regarding planning strategies, development, and implementation of tech-prep programs. Furthermore, it will be better to have higher educational level faculty involved in tech-prep programs.

Recommendations for future research

The recommendations for future research are based on the findings of this study. Replication of the current study should be conducted with a different population, such as a sample from a different department, state, or country to gain a different perspective. This study should also be conducted using different research methods such as the interview and case study methodology to enable a deeper, more detailed understanding of the process of tech-prep program planning, development, and implementation.

Based on the experience of implementing tech-prep programs in America, feasibility studies could be conducted in other countries.

REFERENCES

Aiken, L. R. (1982). Psychological testing and assessment (4th ed.). Boston: Allyn and Bacon.

American Psychological Association, American Educational Research Association, & National Council on Measurement in Education. (1966). Standards for educational and psychological test and manuals. Washington, DC: American Psychological Association.

American Psychological Association, American Educational Research Association, & National Council on Measurement in Education. (1985). Standards for educational and psychological testing. Washington, DC: American Psychological Association.

American Association of Community and Junior Colleges (AACJC). (1988). Building communities: A vision for a new century. A report of the commission on the future of community colleges. Washington, DC: Author.

American Vocational Association. (1990). The AVA guide to the Carl D. Perkins vocational and applied technology education act of 1990. Alexandria, VA: Author.

Arnold, J. (1987). Articulating secondary and postsecondary occupational progress. In C. R. Doty (Ed.), New directions for community college, 58, 57-68.

Ary, D., Jacobs, L. C., & Razavieh, A. (1990). Introduction to research in education (4th ed.). Orlando, Florida: Holt, Rinehart and Winston, Inc.

Bailey, T. (1990). Jobs of the future and the skills they will require: New thinking on an old debate. American Educator, 14(1), 10-15, 40-44.

Baron, R. A. (1983). Behavior in organization: Understanding and managing the human side of work. Boston, Massachusetts: Allyn and Bacon, Inc.

Belcher, C. (1991). Smoothing the rough spots: Identifying issues and overcoming obstacles. In Dan Hull & Dale Parnell (Eds.), Tech-prep association degree: A win/win experience (pp. 113-149). Waco, TX: Center for Occupational Research and Development.

Bender, L. W. (1973). Articulation of secondary and postsecondary occupational education programs. Columbus, OH: Center for Vocational and Technical Education. (ERIC Document Reproduction Service No. ED 090 392)

Blanchard, B. E. (1972). Behavioral characteristics peculiar to articulation in American educational programs. Dayton, OH: Educational Research Center.

Borg, W. R., & Gall, M. D. (1989). Educational research: An introduction (5th ed.). White Plains, NY: Longman.

Bottoms, G. (1984). Now is the movement of opportunity. Vocational Education Journal, 59(7), 8-9.

Bottoms, G., Presson, A., & Johnson, M. (1992). Making high schools work: Through integration of academic and vocational education. Atlanta, GA: Southern Regional Education Board.

Bragg, D. D. (1991). Illinois tech-prep planning strategies. Springfield, IL: Illinois State Board of Education.

Bragg, D. D. (1992a). Introduction to the guide. In D. D. Bragg (Ed.), Implementing tech-prep: a guide to planning a quality initiative (pp. 1-1–1-4). University of California at Berkeley: National Center for Research in Vocational Education.

Bragg, D. D. (1992b). Planning and Implementation of tech-prep by local consortia. In D. D. Bragg (Ed.), Implementing tech-prep: a guide to planning a quality initiative (pp. 5-1–5-20). University of California at Berkeley: National Center for Research in Vocational Education.

Bragg, D. D. (1992c). How to implement tech-prep: Applying Juran's prerequisites for strategic quality management. In D. D. Bragg (Ed.), Implementing tech-prep: A guide to planning a quality initiative (pp. 9-1–9-12). University of California at Berkeley: National Center for Research in Vocational Education.

Breuder, R. L., & Martin, W. (1985-1986, December/January). To market, to market. AACJC Journal, pp. 32-36.

Brick, M. (1967). An analysis of selected business and technology programs in high schools and in two-year colleges and institutes of New York State with a view toward initiating articulation procedures in counterpart offerings. New York, NY: Center for Urban Education. (ERIC Document Reproduction Service No. ED 012 791)

Brown, J. M., Bohns, C., & Gardner H. (1991). Integrating academic skills into postsecondary vocational educational programs through accommodation teams. TASPP Bulletin, 3(1). Champaign, IL: National Center for Research in Vocational Education, University of California at Berkeley.

Bryman, A., & Cramer, D. (1990). Quantitative data analysis for social scientists. London: Routledge.

Burger, L. J., & Lambrecht, J. J. (1974). Handbook for vocational instructors interested in competency-based education. Minneapolis, MN: Minnesota Research Coordinating Unit for Vocational Education.

Bushnell, D. S. et al. (1977). Articulating vocational education at the postsecondary level. Papers from the AACJC/AVA Joint Study.

Bushnell, D. S. (1978a). Cooperation in vocational education. Washington, DC: American Association of Community and Junior Colleges and the American Vocational Association. (ERIC Document Reproduction Service No. ED 164 052)

Bushnell, D. S. (1978b). Closing the gap and eliminating the overlap: Two case studies in articulation. American Vocational Journal, 53(4), 21-23, 26.

Byler, B. L., & Williams, D. L. (1977). Identification of activities to enhance articulation between secondary and postsecondary vocational agriculture programs in Iowa. Ames: Iowa State University of Science and Technology, Department of Agricultural Education.

Canup, C. R., Jr. (1975). Articulation with secondary schools. Paper presented at the Annual Conference of the American Vocational Association, Anaheim, CA.

Center for Occupational Research and Development (1985, September). Two-plus-two articulation: A guidebook for educational planning. Waco, TX: Author.

Center for Occupational Research and Development (1993). Tech-prep: National model sites. Waco, TX: Author

Chase, C. I. (1978). Measurement for educational evaluation. Reading, MA: Addison-Wesley Publishing Company.

Coates, L. E. (1990, November). TQM on campus. NACUBO Business Officer, 26-35.

Colelli, L. A. (1993, April). Tech Prep: A curriculum project for competitive literacy. Paper presented at the Annual Conference of International Technology Education Association, Charlotte, NC.

Commission of Excellence in education. (1983). A nation at risk. Washington, DC: U.S. Department of Education.

Cone, W. H., & Hardy, J. (1979). School-University Network: Toward a model of articulation (A Project of the Council on Research and Service). North Carolina Association Quarterly, 337-343.

Congressional Record, 101st Congress 2nd Session (1990, August 2). The Carl D. Perkins Vocational and Applied Technology Act Amendments of 1990, P.L. 101-392, Title III, Part E–Tech Prep Program.

Coorough, C. (1992). Tech-prep team building. Vocational Education Journal, 67(4), 34-35.

Cronbach, L. J. (1971). Test validation. In R. L. Thorndike (Ed.), Educational measurement (2nd ed.). Washington, DC: American Council on Education, pp. 443-507.

Cummings, P. L. (1984). Articulation of electronics and telecommunications programs at Peninsula Public Secondary Schools, the Peninsula Vocational-Technical Center (new horizons), and Thomas Nelson Community College. Proceedings of a Workshop held at the American Vocational Association Convention (pp. 79-93). New Orleans, LA. (ERIC Document Reproduction Service No. ED 252 713)

Curry, C. W. (1983). Articulation of vocational programs. Secondary/postsecondary handbook. Richmond, VA: Department of Education.

Dashner, M. R. (1980). Factors affecting the attitude-behavior relationship in training evaluation. Master's thesis, Iowa State University, Ames, IA.

DeFleur, M. L., & Wester, F. R. (1963). Attitudes as a scientific concept. Social Forces, 42, 17-31.

Deming, W. E. (1986). Out of the crisis. Cambridge, MA: Massachusetts Institute of Technology Center for Advanced Engineering Study.

Diab, L. N. (1967). Measurement of social attitudes: Problems and prospects. In C. W. Sherif & M. Sherif (Eds.), Attitudes, ego-involvement, and change (pp. 140-158). New York: Wiley, John, & Sons, Inc.

Dornsife, C. J., & Bragg, D. D. (1992). An historical perspective for Tech Prep. In D. D. Bragg (Ed.), Implementing tech-prep: A guide to planning a quality initiative (pp. 2-1–2-17). University of California at Berkeley: National Center for Research in Vocational Education.

Dornsife, C. J. (1992a). Tech-prep and educational reform. In D. D. Bragg (Ed.), Implementing tech-prep: A guide to planning a quality initiative (pp. 3-1–3-19)., University of California at Berkeley: National Center for Research in Vocational Education.

Dornsife, C. J. (1992b). Beyond articulation: The development of tech-prep programs., University of California at Berkeley: National Center for Research in Vocational Education.

Doty, C. R. (1985). Principles and sources for vertical articulation of occupational education from secondary schools to community colleges. Report for the 1984 National Council for Occupational Education Conference. The State University of New Jersey, NJ.

Drier, H., & Bysbers, N. (1989). Strengthening work-related education & training through improved comprehensive guidance and counseling programs in the 1990's. Columbus, OH: Consortium of State Career Guidance Supervisors.

DuBrin, A. J. (1984). Foundations of organizational behavior: An applied perspective. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Dunham, R. B. (1984). Organizational behavior. Homewood, IL: Richard D. Irwin, Inc.

Dutton, M. (1991). It's a team effort: Developing and implementing a TPAD program. In Dan Hull & Dale Parnell (Eds.), Tech-prep association degree: A win/win experience (pp. 87-111). Waco, TX: Center for Occupational Research and Development.

Ebel, R. L. (1966). Obtaining and reporting evidence on content validity. Readings in educational and psychological measurement. Boston: Houghton-Mifflin Co.

Elmore, R. (1987). Analyzing the implementation of federal vocational education policy: The Perkins Act of 1984. In Policy Studies Associates, Inc., Design papers for national assessment of vocational education. Proceedings of the national conference on the condition of vocational education, pp. 333-359. (ERIC Document Reproduction Service No. ED 283 020)

Farland, R., & Anderson, C. (1988). High school articulation. Sacramento: Office of the Chancellor, California Community Colleges.

Farah, J. (1978). Directory for curriculum articulation in Wisconsin. Madison, WI: Board of Vocational, Technical and Adult Education.

Feldman, Marvin (1988, December). Vocational education: Issues for our future. Paper presented at the American Vocational Association Convention, St. Louis, MO.

Fedderson, W., & Loch, W. (1977). A case study in successful articulation: Williamsport Area Community College. Williamsport, PA.

Fleming, M., & Levie, W. H. (1978). Instructional message design: Principles from the behavior sciences. Englewood Cliffs, NJ: Educational Technology Publications.

Friedlander, J. (1980). Working with high schools to strengthen community college programs. Community College Review, 8(1), 9-17.

Fullan, M., Rolheiser-Bennett, C., & Bennett, B. (1990). Linking classroom and school improvement. Educational Leadership, 47(8), 13-19.

Fullan, M. (1991). The new meaning of educational change (2nd ed.). New York: Teachers College Press.

Fullan, M. G. (1992). Successful school improvement. Buckingham, England: Open University Press.

Galloway, J. R., & Washburn, J. (1985). A joint secondary-postsecondary enterprise. Vocational Education Journal, 60(1), 12-14.

Gilli, L. M., & Gilli, A. C., Sr. (1994). Linking apprenticeship with tech-prep. Vocational education Journal, 69(3), 32-33.

Grant, V. W., & Eden L. J. (1982). Digest of educational statistics, 1981. National Center for Educational Statistics. Washington, DC: Government Printing Office.

Greeson, B. (Ed.). (1979). Summary report: Articulation: Today and tomorrow. An Articulation Conference Hosted by Milwaukee Public Schools.

Grubb, W. N., David, G., Lum, J., Pilhal, J., & Morgaine, C. (1991). The cunning hand, the cultured mind: Models for integrating vocational and academic education (MDS-141). University of California at Berkeley: National Center for Research in Vocational Education.

Grubb, N., & Kraskouskas, E. (1992). A time to every purpose: Integrating occupational and academic education in communities colleges and technical institutes. University of California at Berkeley: National Center for Research in Vocational Education.

Hanson, E. M. (1991). Educational administration and organizational behavior. (3rd ed.). Boston, MA: Allyn and Bacon.

Henerson, M. E., Morris, L. L., & Fitz, C. T. (1990). How to measure attitudes. Newbury Park, CA: Sage Publications.

Heuchert, A. H., & Postlewaite, B. W. (Eds.). (1975). Articulation of vocational education. Proceedings of the Sun Mountain Conference. May 18-20. Winthrop, Washington. Olympia, WA: Washington Research Coordinating Unit for Vocational Education.

Hoerner, J. L. (1991, April-May). Tech Prep: A viable solution for the forgotten half. American Technical Education Association Journal. 18-20.

Hoerner, J. L., Clowes, D. A., Wehrley, J., & Hammons, F. (1992). Tech Prep: An embryonic idea and divergent practice. University of California at Berkeley: National Center for Research in Vocational Education.

Huang, C. S. (1993). Relationships among innovativeness, attitudes, and barriers regarding the use of instructional media as perceived by teacher educators in arts education programs at Taiwan teacher colleges. Doctoral dissertation, Iowa State University, Ames, Iowa.

Hull, D. (1984). What high schools and postsecondary schools are finding about training advanced skilled workers: We just can't do it separately! Proceedings of a Workshop held at the American Vocational Association Convention (pp. 33-54). New Orleans, LA. (ERIC Document Reproduction Service No. ED 252 713)

Hull, D., & Parnell, D. (1991). Tech-prep associate degree: A win/win experience. Waco, TX: Center for Occupational Research and Development.

Hull, D. (1992). Getting started in tech-prep. Waco, TX: Center for Occupational Research and Development.

Hull, D. (1993). Opening minds, opening doors: The rebirth of American education. Waco, TX: Center for Occupational Research and Development.

Hurt, H. T., Joseph, K., & Cook, C. D. (1977). Scales for the measurement of innovativeness. Human Communication Research, 4(1), 58-65.

Illinois State Board of Education. (1980). An overview of articulation efforts in vocational education: Implications for state planning. Springfield, IL.

Ingram, M. D., & Troyer, D. (1989). Secondary/postsecondary vocational-technical program articulation handbook. Austin, TX: Texas Higher Education Coordinating Board.

Isch, Jack. (1984). Articulation of technical programs at Oklahoma City Schools, Oklahoma City Vocational-Technical District, Francis Tuttle Vocational-Technical Center, and Oklahoma City Community College. Proceedings of a workshop held at the American Vocational Association Convention (pp. 57-68). New Orleans, LA. (ERIC Document Reproduction Service No. ED 252 713)

Johnston, W. B., & Packer, A. H. (1987). Workforce 2000: Work and workers for the 21st century. Indianapolis, IN: Hudson Institute, Inc.

Jones, C. R. (1985). Perceptions of articulation methods between Georgia's comprehensive high schools and area vocation-technical schools (Doctoral dissertation, University of Illinois at Urbana-Champaign, 1985). Dissertation Abstracts International, 11, 0090.

Juran, J. M. (1990, Winter). U.S.A. quality: Status and prognosis. The BENT of Tau Beta Pi, 25-28.

Katz, D. (1960). The functional approach to the study of attitudes. Public Opinion Quarterly, 24, 163-204.

Kerlinger, F. N. (1979). Behavioral research: A conceptual approach. New York: Holt, Rinehart and Winston, Inc.

Kirby, C. L., & Bragg, D. D. (1992). Total quality management: A new approach for tech-prep. In D. D. Bragg (Ed.), Implementing tech-prep: a guide to planning a quality initiative (pp. 6-1–6-37). University of California at Berkeley: National Center for Research in Vocational Education.

Knight, M. M. (1983). Meeting the high technology challenge through articulation: A discussion of inhibitors and enhancers of vocational curriculum articulation. Paper presented at the annual convention of the American Association of Community and Junior Colleges, New Orleans, LA, April, 24-27.

Kouzes, J. M., & Posner, B. Z. (1990). The leadership challenge. San Francisco, CA: Jossey-Bass.

Law, C. J., Jr. (1994). Tech-prep education: A total quality approach. Lancaster, PA: Technomic Publishing Company, Inc.

Layton, J. D., & Bragg, D. D. (1992). Initiation of tech-prep by the fifty states. In D. D. Bragg (Ed.), Implementing tech-prep: A guide to planning a quality initiative (pp. 4-1–4-18). University of California at Berkeley: National Center for Research in Vocational Education.

Layton, J. D. (1992). How to use group process and quality tools for tech-prep. In D. D. Bragg (Ed.), Implementing tech-prep: A guide to planning a quality initiative (pp. 8-1–8-35). University of California at Berkeley: National Center for Research in Vocational Education.

Little, J. (1990). The mentor phenomenon and the social organization of teaching. In C. Cadzen (Ed.), Review of research in education, 16. Washington, DC: American Educational Research Association.

Long, J. P., Warmbrod, C. P., Faddis, C. P., and Lerner, M. J. (1986). Avenues for articulation: Coordinating secondary and postsecondary programs. The Ohio State University at Columbus, OH: National Center for Research in Vocational Education.

Maricopa Community Colleges. (1985). Articulation: The cooperation of occupational education in Maricopa County, Arizona. Phoenix, AZ: Maricopa Community Colleges.

McClure, L. (1988). Getting to know you: The secondary-postsecondary connection. A guidebook for high school, community college and vocational-technical institute staff in the state of Washington. Centralia, WA: Washington State Board for Vocational Education.

McCormick, F. C. (1980). A comprehensive study of the state of the art of articulation efforts in vocational education: Present and future implications for state of Illinois. Education operations study for the Illinois State Board of Education.

McCormick, F. C., McCormick, E. R., Yoder, C. H., Farrell, B. M., Carson, J. P., & Copa, G. H. (1980). An overview of articulation efforts in vocational education: Implications for state planning. St. Paul, MN: Educational Operations Concepts, Inc. (ERIC Document Reproduction Service No. ED 199 558)

McKinney, F., Fields, E., Kurth, P., & Kelly, F. (1988). Factors influencing success of secondary/postsecondary vocational-technical education articulation programs. The Ohio State University at Columbus, OH: National Center for Research in Vocational Education.

Mehrens, W. A., & Lehmann, I. J. (1973). Measurement and evaluation in education and psychology. New York: Holt, Renehart and Winston, Inc.

Mehrens, W. A., & Lehmann, I. J. (1978). Measurement and evaluation in education and psychology. New York: Holt, Renehart and Winston, Inc.

Mensel, F. (1991). Tech-Prep funding. Community, Technical and Junior College Times, 3(1), 9.

Messick, S. (1975). The standard problem: Meaning and values in measurement and evaluation. American psychologist, 30, 955-966.

Moore, L. M. (1983). An analysis of opinions of New York State directors of secondary and state university two-year college occupational education programs toward selected articulation concerns (Doctoral dissertation, State University of New York at Buffalo, 1983). Dissertation Abstracts International, 44, 0656.

National Center for Educational Statistics. (1970). Standard Terminology for Curriculum and Instruction in Local and State School Systems. In John F. Putnam and W. Dale Chismore (Eds.), State Educational Records and Reports Series: Handbook VI (Report No. OE-23052). Washington, DC: U.S. Office of Education, Department of Health, Education, and Welfare. (ERIC Document Reproduction Service No. ED 048 510).

National Center for Research in Vocational Education. (1992a). Establishing tech prep programs in urban schools: Plans developed at the NCRVE 1992 summer institute (MDS-460), pp. 239-272. University of California at Berkeley: National Center for Research in Vocational Education.

National Center for Research in Vocational Education. (1992b). Tech-prep leadership summit: A conference report (MDS-489). University of California at Berkeley: National Center for Research in Vocational Education.

National Commission on Secondary Vocational Education. (1984). The unfinished agenda. The role of occupational educational education the high school. Washington, DC: Office of Vocational and Adult Education. (ERIC Document Reproduction Service No. ED 251 622)

Norton, R. E., & Faddis, C. R. (1992). As easy as 2+2: One college's 'best practices' vocational-technical program articulation model. The Ohio State University at Columbus, OH: Center on Education and Training for Employment.

Nunnally, J. C. (1982). Reliability of measurement. In H. D. Mitzel (Ed.), Seventy-five years of cooperative extension. New York: Free Press.

Oakes, J. (1992). Can tracking research inform? Technical, normative, and political considerations. Educational Researcher, 21(4), 12-21.

Ohio State University. (1990). Partners in progress: A report by the task force on 2+2 tech-prep curriculum for Hamilton and Clermont counties. Columbus: Author, Center on Education and Training for Employment. (ERIC Document Reproduction Service No. ED 321 092)

Opachinch, C. A., & Linksz, J. J. (1974). A handbook for articulating high school and community college career programs. Catonsville, MD: Catonsville Community College. (ERIC Document Reproduction Service No. ED 104 455)

Oregon State Board of Education. (1968). An approach to the articulation and coordination of occupational preparatory curriculums from the high school through the community college. Paper and reports of Task Forces I & II. Salem, OR: Oregon State Department of Employment and Oregon State Department of Education. (ERIC Document Reproduction Service No. ED 031 570)

Organ, D. W., & Bateman, T. (1986). Organizational behavior: An applied psychology approach (3rd ed.). Plano, TX: Business Publications, Inc.

Organization for Economic Cooperation and Development. (1971). Towards new structures of postsecondary education. Convergence, 4(3), 17-28.

Parnell, D. (1984). 2+2 tech-prep/association degree program: A working degree for America. A concept Paper. Washington, DC: American Association of Community and Junior Colleges. (ERIC Document Reproduction Service No. ED 255 241)

Parnell, D. (1985). The neglected majority. Washington, DC: Community College Press.

Parnell, D. (1986). The community college option. Youth Policy. Washington, DC: Youth Policy Institute Incorporated.

Parnell, D. (1991). Every student a winner: The case for TPAD. In Dan Hull & Dale Parnell (Eds.), Tech-prep association degree: A win/win experience (pp. 1-29). Waco, TX: Center for Occupational Research and Development.

Petry, J. R. et al. (1979). Tennessee educational articulation projects: Final report. Memphis State University, TN: Bureau of Educational Research and Services.

Plihal, J., Johnson, M. A., Bentley, C., Morgaine, C., & Liang, T. (1992). Integration of vocational and academic education: Theory and practice. University of California at Berkeley: National Center for Research in Vocational Education.

Pollard, R. R. (1990). A comparison of the attitudes of university vocational teacher education department chairs and postsecondary deans of instruction toward tech-prep programs. Doctoral dissertation, The University of Nebraska at Lincoln, Nebraska.

Portland Area Vocational/Technical Education Consortium (PAVTEC). (1990). Preparing workforce 2000 through vocational technical 2 + 2 programs (PAVTEC Annual Report). Portland, OR: Author.

Procter & Gamble. (1989). Total quality. Cincinnati, OH: Author.

Project MAVE: Model for articulated vocational education. (1978). Springfield, IL: Division of Adult Vocational and Technical Education, Illinois State Office of Education.

Raizen, S. A. (1989). Reforming education for work: A cognitive science perspective (MDS-024). University of California at Berkeley: National Center for Research in Vocational Education.

Resnick, L. (1987). Education and learning to think. Washington, DC: National Academy Press.

Roberts, P. B., & Clark, D. L. (1994). Integrating technology education and tech-prep. The Technology Teacher, 53(6), 43-44.

Robertson-Smith, M. (1990). Articulation models for vocational education. The Ohio State University at Columbus: Center on Education and Training for Employment.

Roegge, C. (1991). Setting the stage: A practioner's guide to integrating vocational and academic education. Springfield, IL: Illinois State Board of Education.

Savage, E. (1989). A model for technology education in Ohio. Bowling Green, OH: The Model Technology Systems Project.

Schlieman, J. (1976). Articulation of secondary and postsecondary vocational programs in Hawaii: Follow-up study II. Honolulu, HI: Hawaii State Board for Vocational Education.

Schuman, H., & Johnson, M. P. (1976). Attitudes and behavior. In A. Inkeles, J. Coleman, and N. Smelser (Eds.), Annual Review of Sociology (pp. 161-207). Palo Alto, CA: Annual Reviews, Inc.

Secretary's Commission on Achieving Necessary Skills. (1991). What work requires of schools. A SCANS report for America 2000. Washington, DC: U.S. Department of Labor.

Shapiro, B. C. (1984, December). Two plus two: The high school/community college connection. NASSP Bulletin, 70(49), pp. 90-96.

Simonson, M. R. (1979a). Attitude measurement: Why and how. Educational Technology, 19(9), 34-38.

Simonson, M. R. (1979b). Designing instruction for attitudinal outcomes. Journal of Instructional Development, 2(3), 15-19.

Southern Growth Policies Board (1989). Turning to technology. A strategic plan for the nineties. A report of the Southern Technology Council. Research Triangle Park, NC: Author. (ERIC Document Reproduction Service No. ED 309 287).

Spanbauer, S. (1977). Bridging the gap: A model for articulation between secondary and postsecondary vocational educators in Wisconsin. Appleton, WI: Fox Valley Technical Institute.

Stallings, J. A. (1989, April). School achievement efforts and staff development: What are some critical factors? Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Stasz, C., & Grubb, W. N. (1991). Integrating academic and vocational education: Guidelines for assessing a fuzzy reform (MDS-375). University of California at Berkeley Berkeley: National Center for Research in Vocational Education.

State Center Community College. (1990). 2+2+2 equals college credit now! Fresno, CA: Author.

Steele, L. L. (1981). A study of vertical articulation in vocational trade and industrial programs in Colorado (Doctoral dissertation, Colorado State University, 1981). Dissertation Abstracts International, 42, 0053.

Tanner, D., & Tanner, L. N. (1980). Curriculum development (2nd ed.). New York: Macmillan.

Thomas, W. I., & Znaniecki, F. (1918). The polish peasant in Europe and America. Boston: Badger.

Tittle, C. R., & Hill, R. J. (1967). Attitude measurement and prediction of behavior: An evaluation of conditions and measurement techniques. Sciometry, 30, 199-213.

Tri-County Technical College. (1990a). Tech Prep program description. Pendleton, SC: Partnership for Academic and Career Education (PACE).

Tri-County Technical College. (1990b). PACE committee and board members. Pendleton, SC: PACE.

U.S. Department of Labor. (1991). What work requires of schools: A SCANS report for America 2000. Washington, DC: Author.

Venn, G. (1964). Man, education, and work: Postsecondary vocational and technical education. Washington, DC: American Council on Education.

Whitlock, B. W. (1978). Don't hold them back: A critique and guide to new high school-college articulation models. New York, NY: College Entrance Examination Board. (ERIC Document Reproduction Service No. ED 157 414)

Wicker, A. W. (1969). Attitudes versus actions: The relationship of verbal and overt behavioral responses to attitude objects. Journal of social Issues, 25, 41-77.

Wilcox, J. (1991). The Perkins Act. Vocational Education Journal, 66(2), 16-17.

Wirt, J. G. (1991). A new federal law on vocational education: Will reform follow? Phi Delta Kappan, 72(6), 424-433. (EJ 421 306)

Woelfer, C. P. (1978). The articulation of occupational education programs between secondary schools and community colleges/technical institutes project. Research Project of the North Carolina Department of Public Instruction and the North Carolina Department of Community Colleges.

Woelfer, C. P. (1980). Vocational education curriculum articulation in North Carolina. Community College Review, 8(1), 38-44.

Zane, Lawrence F. H. (Ed.). (1973). Institute for advanced study in vocational-technical education: Collaborative roles and functions of occupational education programs (Honolulu, Hawaii, October 1972-June 1973), final report. Hawaii University at Honolulu: Department of Curriculum and Instruction,.

Zimbardo, P. G., Ebbesen, E. B., & Maslach, C. (1977). Influencing attitudes and changing behavior. Philippines: Addison-Wesley Company, Inc.

Zimbardo, P. G., & Ebbesen, E. B. (1970). Influencing attitudes and changing behavior. Reading, MA: Addison Wesley.

ACKNOWLEDGEMENTS

This study has truly been a labor of love, excitement, learning, accomplishment, and sometimes frustration. During the years in which I pursued this final task of my doctoral study, I was blessed with the concern, support, and encouragement from many wonderful people in my life. Sincere and heartfelt gratitude is expressed to the many individuals who have helped me complete this endeavor.

I would specially like to express my sincere gratitude to my committee members: Dr. Larry L. Bradshaw, Dr. William D. Wolansky, Dr. Robert F. Strahan, Dr. Arthur Akers, Dr. Hsien-Sen Hung, and Dr. John N. Riley. I am most grateful to Dr. Wolansky, co-major, for his concern and encouragement for my study and the progress of the dissertation even though he passed away on August 21, 1993. Dr. Bradshaw, co-major professor, thoughtfully guided me during the early years of my doctoral work ,and supported me in the last stages of this research. Dr. Riley joined the committee as a substitute co-major and contributed thoughtfully at the end. Dr. Strahan offered expert technical advice and patience regarding the statistical procedures used in this dissertation. Dr. Akers and Dr. Hung shared their time whenever I needed to discuss my work with them. The participation of each committee member in my doctoral study helped to make it a rewarding experience.

Gratitude is expressed to Dr. Mack Shelley for his assistance in the analysis of the data. I would also like to thank the many individuals of the tech-prep programs who took the time to revise, distribute, or complete the survey.

Without the financial support from my family, I could not have pursued my doctoral degree in the United States. I greatly appreciate this valuable support. Sincere appreciation is extended to my parents for their encouragement and moral support through my doctoral study. Finally, I am deeply indebted to my wife, Yen-Feng Sun, and my two sons, Wei-Hao and Kuei-Pin. They have been understanding and patient as I worked on my doctoral degree. Their love, confidence, and support were there when I studied abroad for long periods of time at Iowa State University.

APPENDIX A. RELIABILITY OF ORIGINAL AND NEW VARIABLES

Table A.1. Reliability analysis of total survey item for original variables

Deleted variable	Standardized variables	
	Correlation with total	Alpha
Philo1	.3858	.8826
Philo2	.3913	.8825
Philo3	.0259	.8886
Philo4	.2896	.8842
Philo5	.5852	.8792
Philo6	.3904	.8825
Philo7	.3208	.8837
Philo8	.4044	.8823
Philo9	.2271	.8853
Philo10	.1127	.8871
Admin1	-.1180	.8909
Admin2	.3751	.8828
Admin3	.3517	.8832
Admin4	.6261	.8785
Admin5	.5510	.8798
Admin6	.5189	.8804
Admin7	.4943	.8808
Admin8	.4993	.8807
Admin9	.4727	.8811
Admin10	.2286	.8852
Curr1	.4468	.8816
Curr2	.5221	.8803
Curr3	.5634	.8796
Curr4	.3524	.8832
Curr5	.5853	.8792
Curr6	.2805	.8844
Curr7	.3978	.8824
Curr8	.2630	.8847
Curr9	.1943	.8858
Curr10	.3837	.8827
Barr1	.4586	.8814
Barr2	.4334	.8818
Barr3	.5023	.8806
Barr4	.4501	.8815
Barr5	.1858	.8859
Barr6	.4585	.8814
Barr7	.4593	.8814
Barr8	.3220	.8837
Barr9	.3993	.8824
Barr10	.3816	.8827

Reliability coefficient 40 items
Standardized item alpha = .8853

Table A.2. Reliability analysis of original variable: philosophy

Deleted variable	Standardized variables	
	Correlation with total	Alpha
Philo1	.3647	.6891
Philo2	.4028	.6826
Philo3	.0939	.7324
Philo4	.2911	.7013
Philo5	.5704	.6532
Philo6	.4660	.6717
Philo7	.4932	.6670
Philo8	.5526	.6564
Philo9	.2952	.7006
Philo10	.1978	.7163

Reliability coefficient 10 items
Standardized item alpha = .7106

Table A.3. Reliability analysis of original variable: administration

Deleted variable	Standardized variables	
	Correlation with total	Alpha
Admin1	-.0522	.7691
Admin2	.2435	.7269
Admin3	.3188	.7154
Admin4	.4478	.6950
Admin5	.5705	.6746
Admin6	.5887	.6715
Admin7	.5717	.6744
Admin8	.5887	.6715
Admin9	.5319	.6811
Admin10	.1288	.7438

Reliability coefficient 10 items
Standardized item alpha = .7265

Table A.4. Reliability analysis of original variable: curriculum

Deleted variable	Standardized variables	
	Correlation with total	Alpha
Curr1	.5078	.7786
Curr2	.3680	.7946
Curr3	.6157	.7657
Curr4	.4080	.7901
Curr5	.7262	.7521
Curr6	.4164	.7891
Curr7	.6088	.7665
Curr8	.4128	.7895
Curr9	.3448	.7972
Curr10	.3481	.7968

Reliability coefficient 10 items
Standardized item alpha = .8000

Table A.5. Reliability analysis of original variable: barriers

Deleted variable	Standardized variables	
	Correlation with total	Alpha
Barr1	.6499	.8694
Barr2	.7276	.8636
Barr3	.6382	.8702
Barr4	.7161	.8645
Barr5	.4323	.8849
Barr6	.6029	.8728
Barr7	.6846	.8668
Barr8	.5859	.8741
Barr9	.6240	.8713
Barr10	.4818	.8815

Reliability coefficient 10 items
Standardized item alpha = .8834

Table A.6. Reliability analysis of new variable: curriculum

Deleted variable	Standardized variables	
	Correlation with total	Alpha
Philo1	.5069	.8756
Philo2	.4837	.8763
Philo4	.4064	.8786
Philo5	.6769	.8705
Philo6	.4839	.8763
Philo7	.4227	.8780
Philo8	.5030	.8757
Philo9	.2594	.8828
Philo10	.2918	.8819
Admin2	.4346	.8777
Admin4	.6007	.8728
Admin10	.3596	.8799
Curr1	.5858	.8732
Curr2	.3765	.8794
Curr3	.6457	.8714
Curr4	.4907	.8761
Curr5	.7113	.8694
Curr6	.3822	.8793
Curr7	.5916	.8731
Curr8	.4480	.8773
Curr9	.3650	.8798
Curr10	.3596	.8799

Reliability coefficient 22 items
Standardized item alpha = .8816

Table A.7. Reliability analysis of new variable: administration

Deleted variable	Standardized variables	
	Correlation with total	Alpha
Admin3	.4870	.9139
Admin5	.6085	.9102
Admin6	.6342	.9095
Admin7	.6235	.9098
Admin8	.6002	.9105
Admin9	.6034	.9104
Barr1	.6138	.9101
Barr2	.7160	.9069
Barr3	.6286	.9096
Barr4	.6826	.9080
Barr5	.4262	.9157
Barr6	.6657	.9085
Barr7	.7210	.9068
Barr8	.5768	.9112
Barr9	.6050	.9104
Barr10	.5149	.9131

Reliability coefficient 16 items
Standardized item alpha = .9155

APPENDIX B. HUMAN SUBJECT REVIEW

Information for Review of Research Involving Human Subjects
Iowa State University

(Please type and use the attached instructions for completing this form)

1. Title of Project: A comparison of secondary and postsecondary school teachers' and administrators' attitudes toward Tech Prep programs

2. I agree to provide the proper surveillance of this project to insure that the rights and welfare of the human subjects are protected. I will report any adverse reactions to the committee. Additions to or changes in research procedures after the project has been approved will be submitted to the committee for review. I agree to request renewal of approval for any project continuing more than one year.

Huang, Liang-Chih	Oct. 21, '93	Huang, Liang-Chih
Typed Name of Principal Investigator	Date	Signature of Principal Investigator

Industrial Education & Technology	B 7B I Ed II	4-6529
Department	Campus Address	Campus Telephone

3. Signatures of other investigators

Signatures of other investigators	Date	Relationship to Principal Investigator
[signature]	10/21/93	Major Advisor
John N. Riley	10/25/93	Co-Major Advisor

RECEIVED
OCT 26 1993
GRADUATE COLLEGE
ISU

4. Principal Investigator(s) (check all that apply)
   - ☐ Faculty ☐ Staff ☒ Graduate Student ☐ Undergraduate Student

5. Project (check all that apply)
   - ☐ Research ☒ Thesis or dissertation ☐ Class project ☐ Independent Study (490, 590, Honors project)

6. Number of subjects (complete all that apply)
   - 200 # Adults, non-students
   - ___ # ISU student
   - ___ # minors under 14
   - ___ # minors 14 - 17
   - ___ other (explain)

7. Brief description of proposed research involving human subjects: (See instructions, Item 7. Use an additional page if needed.)

   Please see attached sheets.

(Please do not send research, thesis, or dissertation proposals.)

8. Informed Consent:
   - ☐ Signed informed consent will be obtained. (Attach a copy of your form.)
   - ☒ Modified informed consent will be obtained. (See instructions, item 8.)
   - ☐ Not applicable to this project.

9. Confidentiality of Data: Describe below the methods to be used to ensure the confidentiality of data obtained. (See instructions, item 9.)

(1) The code number on the questionnaire will be used for the purpose of follow-up only on unreturned questionnaires.

(2) All data will be kept confidential and stored for future analysis.

(3) All data will be reported in form of group results.

10. What risks or discomfort will be part of the study? Will subjects in the research be placed at risk or incur discomfort? Describe any risks to the subjects and precautions that will be taken to minimize them. (The concept of risk goes beyond physical risk and includes risks to subjects' dignity and self-respect as well as psychological or emotional risk. See instructions, item 10.)

There is no risk to Tech Prep program faculty at secondary and postsecondary schools who will be asked to participate because response will be kept confidential.

11. **CHECK ALL** of the following that apply to your research:

- ☐ A. Medical clearance necessary before subjects can participate
- ☐ B. Samples (Blood, tissue, etc.) from subjects
- ☐ C. Administration of substances (foods, drugs, etc.) to subjects
- ☐ D. Physical exercise or conditioning for subjects
- ☐ E. Deception of subjects
- ☐ F. Subjects under 14 years of age and/or ☐ Subjects 14 - 17 years of age
- ☐ G. Subjects in institutions (nursing homes, prisons, etc.)
- ☐ H. Research must be approved by another institution or agency (Attach letters of approval)

If you checked any of the items in 11, please complete the following in the space below (include any attachments):

Items A - D Describe the procedures and note the safety precautions being taken.

Item E Describe how subjects will be deceived; justify the deception; indicate the debriefing procedure, including the timing and information to be presented to subjects.

Item F For subjects under the age of 14, indicate how informed consent from parents or legally authorized representatives as well as from subjects will be obtained.

Items G & H Specify the agency or institution that must approve the project. If subjects in any outside agency or institution are involved, approval must be obtained prior to beginning the research, and the letter of approval should be filed.

Last Name of Principal Investigator Huang

Checklist for Attachments and Time Schedule

The following are attached (please check):

12. [X] Letter or written statement to subjects indicating clearly:
    a) purpose of the research
    b) the use of any identifier codes (names, #'s), how they will be used, and when they will be removed (see Item 17)
    c) an estimate of time needed for participation in the research and the place
    d) if applicable, location of the research activity
    e) how you will ensure confidentiality
    f) in a longitudinal study, note when and how you will contact subjects later
    g) participation is voluntary; nonparticipation will not affect evaluations of the subject

13. [ ] Consent form (if applicable)

14. [ ] Letter of approval for research from cooperating organizations or institutions (if applicable)

15. [X] Data-gathering instruments

16. Anticipated dates for contact with subjects:

First Contact	Last Contact
Nov. 1, 1993	Nov. 28, 1993
Month / Day / Year	Month / Day / Year

17. If applicable: anticipated date that identifiers will be removed from completed survey instruments and/or audio or visual tapes will be erased:

Dec. 15, 1993
Month / Day / Year

18. Signature of Departmental Executive Officer — Date — Department or Administrative Unit

John C. Dugger — 10/25/93 — Industrial Education & Technology

19. Decision of the University Human Subjects Review Committee:

X Project Approved ___ Project Not Approved ___ No Action Required

Patricia M. Keith — 11-2-93 — P M Keith
Name of Committee Chairperson — Date — Signature of Committee Chairperson

GC:1/90

APPENDIX C. COVER LETTER AND SURVEY INSTRUMENT

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

College of Education
Department of Industrial
Education and Technology
114 I. Ed. II
Ames, Iowa 50011-3130
515 294-1033
FAX 515 294-1123

October 19, 1993

Dr. James Wingate
Department of Community Colleges
301 North Wilmington Street
Raleigh, NC 27601-2825

Dear Wingate:

It is my pleasure to write to you. I am a graduate student under the guidance of Drs. Larry L. Bradshaw and John N. Riley in the department of Industrial Education and Technology at Iowa State University.

I am interested in Tech-Prep programs and my dissertation research topic is to compare the attitudes of teachers and administrators in secondary and postsecondary schools toward Tech-Prep programs.

At this time, I would like to select two postsecondary schools from your state that are involved and have strong Tech-Prep programs which have been conducted for at least two years. Could you send me the names of schools and the addresses of contact people at each school who are administratively and directly responsible for the particular local programs? Your assistance will be greatly appreciated.

So far, I have finished my questionnaire draft. After modification and pilot test, the questionnaire will be mailed to those schools you have recommended on about November 1, 1993. It will take about twenty minutes to complete the questionnaire.

If you have any questions, please contact me at the above address or at 1229 Hawthorn Court, Ames, IA 50010. My phone number is (515) 296-8225.

Thank you kindly for your help.

Sincerely yours,

James Huang
James Liang-Chih Huang
Doctoral Candidate

John N. Riley
Dr. John N. Riley
Professor & Co-Major Advisor

Dr. Larry L. Bradshaw
Assistant Professor & Co-Major Advisor
Larry L. Bradshaw

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

College of Education
Department of Industrial
Education and Technology
114 I. Ed. II
Ames, Iowa 50011-3130
515 294-1033
FAX 515 294-1123

November 5, 1993

Bob Kemmery
Eastern Technical High School
1100 Mace Avenue
Baltimore, MD 21221

Dear Kemmery:

I am a graduate student under guidance of Drs. John N. Riley and Larry L. Bradshaw in the Department of Industrial Education and Technology at Iowa State University. Presently, I am conducting a research study about Tech Prep. Your school/schools has been recommended by Ms. Judy K. Loar of the State Tech Prep Specialist and Mr. Ed Fangman of the Tech Prep Coordinator, who are actively engaged in the implementation of Tech Prep programs. Please help me distribute the enclosed questionnaires in each envelope to <u>four teachers</u> of tech-prep/technical programs and <u>one administrator</u> (principal/president) you select from your school/schools.

This questionnaire is designed to compare secondary and postsecondary school teachers' and administrators' attitudes toward Tech Prep programs. The survey will take approximately twenty minutes to complete. Participation is voluntary and any information that is provided will be kept strictly confidential. Individual questionnaires are coded only for follow-up purposes to non-respondents. Code numbers will be removed immediately upon receipt of the questionnaire. All data will be analyzed and reported as group data only.

Please collect the questionnaires and send them back to me before <u>Nov. 25, 1993</u>, using the postage-paid envelope. I greatly appreciate your assistance in this Tech Prep study. I have enclosed a complimentary set of four keepsake stamps in my country, Taiwan, Republic of China. I hope you will like them.

Thank you kindly for your help. If you have any questions, please contact me at the above address or at 1229 Hawthorn Court, Ames, IA 50010. My telephone and fax numbers are (515) 296-8225.

Sincerely yours,

James L. C. Huang
James Liang-Chih Huang
Doctoral Candidate

John N. Riley
John N. Riley, Ed.D.
Professor & Co-Major Advisor

Larry L. Bradshaw
Larry L. Bradshaw, Ph.D.
Assistant Professor & Co-Major Advisor

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

College of Education
Department of Industrial
Education and Technology
114 I. Ed. II
Ames, Iowa 50011-3130
515 294-1033
FAX 515 294-1123

November 5, 1993

Dear Madam/Sir:

I am a graduate student under guidance of Drs. John N. Riley and Larry L. Bradshaw in the Department of Industrial Education and Technology at Iowa State University. Presently, I am conducting a research study about Tech Prep. Your school/schools has been identified by Mr. Jerry O'Hare of the State Board of Education, who is actively engaged in the implementation of Tech Prep programs. The purpose of this study is to obtain a better understanding regarding the secondary and postsecondary teachers' and administrators' attitudes toward Tech Prep programs.

Enclosed is a questionnaire regarding implementation of Tech Prep programs in your school/schools. Your participation in this study is voluntary. Any information that you provide will be kept strictly confidential. Individual questionnaires are coded only for follow-up purposes to non-respondents. Code numbers will be removed immediately upon receipt of the questionnaire. All data will be analyzed and reported as group data only.

The survey will take approximately twenty minutes to finish. After completing the questionnaire, please seal it in the envelope provided and return it before *the 20th of November, 1993*, to the person who distributed it to you.

Also, enclosed is a complimentary keepsake stamp of the Tiger pattern in my country, Taiwan, Republic of China. I hope you will like it.

Thank you for participation. I greatly appreciate your assistance in this Tech Prep study.

Respectfully,

James L.C. Huang
James Liang-Chih Huang
Doctoral Candidate

John N. Riley
John N. Riley, Ed.D.
Professor & Co-Major Advisor

Larry L. Bradshaw
Larry L. Bradshaw, Ph.D.
Assistant Professor & Co-Major Advisor

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

College of Education
Department of Industrial
Education and Technology
114 I. Ed. II
Ames, Iowa 50011-3130
515 294-1033
FAX 515 294-1123

November 5, 1993

Diane Honeycutt
Richmond Community College
P.O. Box 1189
Highway 74E
Hamlet, NC 28345

Dear Honeycutt:

I am a graduate student under guidance of Drs. John N. Riley and Larry L. Bradshaw in the Department of Industrial Education and Technology at Iowa State University. Presently, I am conducting a research study about Tech Prep. You and your school/schools have been recommended by the Center for Occupational Research and Development (CORD) from the list of participants of the National Tech Prep Network Fall Conference in Atlanta, Georgia. Please help me distribute the enclosed questionnaires in each envelope to four teachers of tech-prep/technical programs and one administrator (principal/president) you select from your school/schools.

This questionnaire is designed to compare secondary and postsecondary school teachers' and administrators' attitudes toward Tech Prep programs. The survey will take approximately twenty minutes to complete. Participation is voluntary and any information that is provided will be kept strictly confidential. Individual questionnaires are coded only for follow-up purposes to non-respondents. Code numbers will be removed immediately upon receipt of the questionnaire. All data will be analyzed and reported as group data only.

Please collect the questionnaires and send them back to me before Nov. 25, 1993, using the postage-paid envelope. I greatly appreciate your assistance in this Tech Prep study. I have enclosed a complimentary set of four keepsake stamps in my country, Taiwan, Republic of China. I hope you will like them.

Thank you kindly for your help. If you have any questions, please contact me at the above address or at 1229 Hawthorn Court, Ames, IA 50010. My telephone and fax numbers are (515) 296-8225.

Sincerely yours,

James L. C. Huang
James Liang-Chih Huang
Doctoral Candidate

John N. Riley
John N. Riley, Ed.D.
Professor & Co-Major Advisor

Larry L. Bradshaw
Larry L. Bradshaw, Ph.D.
Assistant Professor & Co-Major Advisor

NOV 10 1993

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

College of Education
Department of Industrial
Education and Technology
114 I. Ed. II
Ames, Iowa 50011-3130
515 294-1033
FAX 515 294-1123

November 5, 1993

Dear Madam/Sir:

I am a graduate student under guidance of Drs. John N. Riley and Larry L. Bradshaw in the Department of Industrial Education and Technology at Iowa State University. Presently, I am conducting a research study about Tech Prep. Your school/schools has been recommended by the Center for Occupational Research and Development (CORD), Waco, Texas. The purpose of this study is to obtain a better understanding regarding the secondary and postsecondary teachers' and administrators' attitudes toward Tech Prep programs.

Enclosed is a questionnaire regarding implementation of Tech Prep programs in your school/schools. Your participation in this study is voluntary. Any information that you provide will be kept strictly confidential. Individual questionnaires are coded only for follow-up purposes to non-respondents. Code numbers will be removed immediately upon receipt of the questionnaire. All data will be analyzed and reported as group data only.

The survey will take approximately twenty minutes to finish. After completing the questionnaire, please seal it in the envelope provided and return it before *the 20th of November, 1993*, to the person who distributed it to you.

Also, enclosed is a complimentary keepsake stamp of the Tiger pattern in my country, Taiwan, Republic of China. I hope you will like it.

Thank you for participation. I greatly appreciate your assistance in this Tech Prep study.

Respectfully,

James L.C. Huang

James Liang-Chih Huang
Doctoral Candidate

John N. Riley

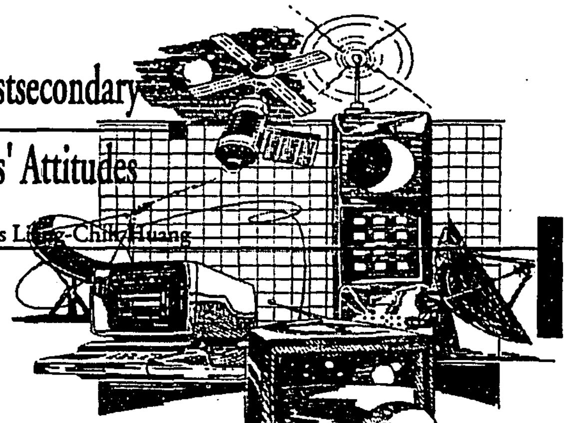
John N. Riley, Ed.D.
Professor & Co-Major Advisor

Larry L. Bradshaw

Larry L. Bradshaw, Ph.D.
Assistant Professor & Co-Major Advisor

A Comparison of Secondary and Postsecondary School Teachers' and Administrators' Attitudes Toward Tech Prep Programs

by James Liang-Chih Huang



IOWA STATE UNIVERSITY
Department of Industrial Education & Technology

DEMOGRAPHICS

DIRECTIONS: Please write your response or place an 'x' on the line provided for each of the following items.

A. Position title :
____ 1. Tech-prep/technical/vocational/academic program instructor
____ 2. Tech-prep director/coordinator
____ 3. School administrator (Principal/President)
____ 4. Others (please specify____________________________)

B. School level :
____ 1. Secondary school
____ 2. Postsecondary school/Institution

C. Educational level :
____ 1. Less than BS degree ____ 2. Bachelors degree ____ 3. Masters degree
____ 4. Masters + 30 ____ 5. Doctorate degree

D. Years of teaching experience:
____ 1. 1-5 yrs ____ 2. 6-10 yrs
____ 3. 11-15 yrs ____ 4. 16-20 yrs
____ 5. 21 + yrs

Years of administrative experience:
____ 1. 1-5 yrs ____ 2. 6-10yrs
____ 3. 11-15 yrs ____ 4. 16-20yrs
____ 5. 21 + yrs

E. Number of times of in-service training activities were held regarding tech-prep programs between 1990-1993:
1. Seminar____ times 2. Workshop____ times
3. Conference____ times 4. Staff meeting____ times
5. Others____ times (please specify____________________________)

Thank you for your cooperation! No.:

DIRECTIONS: In the next four sections (I, II, III, & IV), please consider the implementation of tech-prep programs in your school/ schools. Please circle one number between 1 and 7 that best describes your opinion concerning each question.

1= Strongly Disagree (SD)
2= Disagree (D)
3= Moderately Disagree (MD).
4= Neutral (N)
5= Moderately Agree (MA)
6= Agree (A)
7= Strongly Agree (SA)

SECTION I: PHILOSOPHY OF TECH PREP PROGRAMS	SD	D	MD	N	MA	A	SA
1. Tech-prep programs reduce the dropout rate in high schools better than other programs.	1	2	3	4	5	6	7
2. Tech-prep programs provide sufficient preparation for employment in the "technological" jobs of the future.	1	2	3	4	5	6	7
3. Tech-prep programs should be designed primarily for the general education students.	1	2	3	4	5	6	7
4. Tech-prep programs will prepare students for any level of education.	1	2	3	4	5	6	7
5. Tech-prep programs can link high school and community college programs, eliminating "gaps" and "overlaps".	1	2	3	4	5	6	7
6. Teachers and administrators should attend in-service training regarding tech-prep programs to help them communicate with each other.	1	2	3	4	5	6	7
7. Business/industry should jointly develop and implement tech-prep programs with schools.	1	2	3	4	5	6	7
8. Tech-prep programs could help meet the employment needs as required by business/industry.	1	2	3	4	5	6	7
9. It is necessary to establish follow-up programs on graduates of my school for feedback or suggestions to strengthen tech-prep programs.	1	2	3	4	5	6	7
10. Tech-prep programs should be designed to have flexibility for individual differences of students.	1	2	3	4	5	6	7
SECTION II: ADMINISTRATION OF TECH PREP PROGRAMS							
11. Modifications of the existing facilities at my school/schools would be necessary for implementation of tech-prep programs.	1	2	3	4	5	6	7
12. A tech-prep program would be a good recruiting tool for my school/ schools.	1	2	3	4	5	6	7

	SD	D	MD	N	MA	A	SA
13. Teachers/administrators have enough opportunities to attend in-service training related to tech-prep programs in my school/schools.	1	2	3	4	5	6	7
14. Tech-prep programs are good public relation tools for my school/schools.	1	2	3	4	5	6	7
15. My administrator/faculty supports the implementation of tech-prep programs.	1	2	3	4	5	6	7
16. There is a strong administrative leadership in my school/schools to support the implementation of tech-prep programs.	1	2	3	4	5	6	7
17. There is appropriate planning to implement tech-prep programs in my school/schools.	1	2	3	4	5	6	7
18. I am satisfied with the current articulation agreements in my school/ schools.	1	2	3	4	5	6	7
19. There are sufficient resources provided within my school/schools to provide tech-prep students personal guidance and counseling services.	1	2	3	4	5	6	7
20. It is reasonable to let tech-prep students enter, exit, or change programs at any time.	1	2	3	4	5	6	7

SECTION III: CURRICULUM OF TECH PREP PROGRAMS

21. Tech-prep programs could reduce duplication of courses for the students.	1	2	3	4	5	6	7
22. The current curriculum of tech-prep programs have reflected real-world applications in both vocational and academic courses in my school/ schools.	1	2	3	4	5	6	7
23. Tech-prep programs are a good way to prepare youth for their transition from high school to postsecondary institutions.	1	2	3	4	5	6	7
24. It is necessary to have regular curriculum advisory committees to review, modify or revise my tech-prep curriculum.	1	2	3	4	5	6	7
25. Tech-prep programs are a good beginning in preparing students for workforce readiness.	1	2	3	4	5	6	7
26. Tech-prep programs provide a valuable alternative to college-prep programs.	1	2	3	4	5	6	7
27. Tech-prep programs could be an improvement over general/academic education programs.	1	2	3	4	5	6	7

(Continued on Back)

	SD	D	MD	N	MA	A	SA
28. Tech-prep programs will overcome the inadequacies of the current education curriculum.	1	2	3	4	5	6	7
29. With the advent of tech-prep programs, guidance counselors will require additional training in vocational guidance.	1	2	3	4	5	6	7
30. Tech-prep programs have integrated vocational and academic curriculum in secondary and postsecondary schools.	1	2	3	4	5	6	7

SECTION IV: BARRIERS OF TECH PREP PROGRAMS

31. There is a lack of faculty communication between secondary and postsecondary schools in my school/schools.	1	2	3	4	5	6	7
32. There is a lack of communication between administrators and teachers within my school/schools.	1	2	3	4	5	6	7
33. There is a lack of communication between secondary/postsecondary schools and business/industry in my school/schools.	1	2	3	4	5	6	7
34. There is a lack of knowledge for faculty to make changes in my school/schools.	1	2	3	4	5	6	7
35. There is a lack of funding to buy equipment and materials in my school/schools.	1	2	3	4	5	6	7
36. There is a lack of teachers' in-service training opportunities regarding tech-prep programs in my school/schools.	1	2	3	4	5	6	7
37. There is a lack of administrators' in-service training opportunities regarding tech-prep programs in my school/schools.	1	2	3	4	5	6	7
38. "Turfism" is a problem in implementing a tech-prep program in my school/schools.	1	2	3	4	5	6	7
39. The concept of tracking is a problem to the implementation of tech-prep programs in my school/schools.	1	2	3	4	5	6	7
40. My administrator/faculty resists the implementation of tech-prep programs in my school/schools.	1	2	3	4	5	6	7

Additional comments:

APPENDIX D. FOLLOW-UP LETTER

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

College of Education
Department of Industrial
Education and Technology
114 I. Ed. II
Ames, Iowa 50011-3130
515 294-1033
FAX 515 294-1123

December 1, 1993

Mr. Louis E. Collier
Tech Prep Consortium Director
Mountain Empire Community College
P.O. Drawer 700
Big Stone Gap, VA 24219

Dear Mr. Collier:

It is our pleasure to write to you again. We know that this is a very busy time for you but we do need your help! You recently received the questionnaires from us asking you to distribute them to four tech-prep teachers and one administrator from your school/schools. To date, we have not received those completed questionnaires. However, if you have mailed them recently, we want to express our thanks to you.

If you have not mailed those questionnaires, we would ask you to distribute the enclosed questionnaires to the tech-prep teachers and administrator and let them drop it in a mailbox. We would like to receive all questionnaires before the 17th of December, 1993.

Thank you for your voluntary participation in this study. We appreciate the time and effort involved.

If you have any questions, please contact me at the above address or at 1229 Hawthorn Court, Ames, IA 50010. My phone number is (515) 296-8225.

Sincerely yours,

James L.C. Huang
James Liang-Chih Huang
Doctoral Candidate

John N. Riley
Dr. John N. Riley
Professor & Co-Major Advisor

Larry L. Bradshaw
Dr. Larry L. Bradshaw
Assistant Professor & Co-Major Advisor

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

College of Education
Department of Industrial
Education and Technology
114 I. Ed. II
Ames, Iowa 50011-3130
515 294-1033
FAX 515 294-1123

November 30, 1993

Dear Madam/Sir:

We know that this is a very busy time for you but we do need your help! You recently received the questionnaire from us asking your perception toward Tech-Prep programs. To date, we have not received your completed questionnaire. However, if you have returned it recently, we want to express our thanks to you.

If you have not returned your questionnaire, we would ask you to complete the enclosed questionnaire and drop it in a mailbox before December 17, 1993.

Thank you for your voluntary participation in this study. We appreciate the time and effort involved, and believe that your responses will be useful for the comparison of secondary and postsecondary school teachers' and administrators' attitudes toward Tech-Prep programs.

If you have any questions, please contact me at the above address or at 1229 Hawthorn Court, Ames, IA 50010. My phone number is (515) 296-8225.

Sincerely yours,

James L. C. Huang
James Liang-Chih Huang
Doctoral Candidate

John N. Riley
Dr. John N. Riley
Professor & Co-Major Advisor

Larry L. Bradshaw
Dr. Larry L. Bradshaw
Assistant Professor & Co-Major Advisor

APPENDIX E. ADDITIONAL STATISTICAL TABLE FOF EACH ITEM BY POSITION TITLE AND SCHOOL LEVEL

Table E.1. Mean, standard deviation, and t-prob for each dependent variable by tech-prep teachers and administrators--philosophy

Philosophical issues		Tech-prep teachers	Administrators	t-prob
1. Tech-prep programs reduce the dropout rate in high schools better than other programs.	M SD	5.22 1.16	5.51 1.01	0.13
2. Tech-prep programs provide sufficient preparation for employment in the "technological" jobs of the future.	M SD	5.35 1.20	5.43 1.68	0.77
3. Tech-prep programs should be designed primarily for the general education students.	M SD	3.76 1.89	3.06 1.96	0.03*
4. Tech-prep programs will prepare students for any level of education.	M SD	4.99 1.73	5.18 1.68	0.50
5. Tech-prep programs can link high school school and community college programs, eliminating "gap" and "overlaps".	M SD	6.28 0.89	6.44 0.63	0.20
6. Teachers and administrators should attend in-service training regarding tech-prep programs to help them communicate with each other.	M SD	6.55 0.67	6.47 0.72	0.51
7. Business/industry should jointly develop and implement tech-prep programs with schools.	M SD	6.51 0.80	6.47 0.69	0.74
8. Tech-prep programs could help meet the employment needs as required by business/industry.	M SD	6.23 0.89	6.20 0.95	0.84
9. It is necessary to establish follow-up programs on graduates of my school for feedback or suggestions to strengthen tech-prep programs.	M SD	6.18 0.89	6.53 0.66	0.01**
10. Tech-prep programs should be designed to have flexibility for individual differences of students.	M SD	5.88 1.22	6.29 0.94	0.02*

* $p < .05$ ** $p < .01$ M = mean SD = standard deviation

Scale used: 1 = strongly disagree; 2 = disagree; 3 = moderately disagree; 4 = neutral; 5 = moderately agree; 6 = agree; 7 = strongly agree

Table E.2. Mean, standard deviation, and t-prob for each dependent variable by tech-prep teachers and administrators--administration

Administrative issues		Tech-prep teachers	Administrators	t-prob
11. Modifications of the existing facilities at my school/schools would be necessary for implementation of tech-prep programs.	M SD	4.07 2.02	4.20 1.87	0.69
12. A tech-prep program would be a good recruiting tool for my school/schools.	M SD	5.76 1.07	5.64 1.21	0.51
13. Teachers/administrators have enough opportunities to attend in-service training related to tech-prep programs in my school/schools.	M SD	4.32 1.93	4.09 1.93	0.48
14. Tech-prep programs are good public relation tools for my school/schools.	M SD	5.84 0.85	5.91 0.93	0.66
15. My administrator/faculty supports the implementation of tech-prep programs.	M SD	5.82 1.13	5.87 1.00	0.75
16. There is a strong administrative leadership in my school/schools to support the implementation of tech-prep programs.	M SD	5.63 1.47	5.91 1.08	0.17
17. There is appropriate planning to implement tech-prep programs in my school/schools.	M SD	4.78 1.74	5.07 1.44	0.28
18. I am satisfied with the current articulation agreements in my school/schools	M SD	4.73 1.59	4.98 1.53	0.33
19. There are sufficient resources provided within my school/schools to provide tech-prep students personal guidance and counseling services.	M SD	4.07 1.74	4.40 1.68	0.25
20. It is reasonable to let tech-prep students enter, exit, or change programs at any time.	M SD	4.13 1.50	4.45 1.86	0.24

M = mean SD = standard deviation
Scale used: 1 = strongly disagree; 2 = disagree; 3 = moderately disagree; 4 = neutral; 5 = moderately agree; 6 = agree; 7 = strongly agree

Table E.3. Mean, standard deviation, and t-prob for each dependent variable by tech-prep teachers and administrators--curriculum

Curriculum issues		Tech-prep teachers	Administrators	t-prob
21. Tech-prep programs could reduce duplication of courses for the students.	M SD	5.34 1.27	5.76 1.13	0.04*
22. The current curriculum of tech-prep programs have reflected real-world applications in both vocational and academic courses in my school/schools.	M SD	5.24 1.23	5.30 1.42	0.78
23. Tech-prep programs are a good way to prepare youth for their transition from high school to postsecondary institutions.	M SD	5.93 1.12	6.22 0.83	0.07
24. It is necessary to have regular curriculum advisory committees to review, modify or revise my tech-prep curriculum.	M SD	5.95 0.95	6.24 0.86	0.06
25. Tech-prep programs are a good beginning in preparing students for workforce readiness.	M SD	6.35 0.81	6.40 0.66	0.67
26. Tech-prep programs provide a valuable alternative to college-prep programs.	M SD	6.04 1.36	6.04 1.25	0.99
27. Tech-prep programs could be an improvement over general/academic education programs	M SD	6.30 0.99	6.36 0.87	0.69
28. Tech-prep programs will overcome the inadequacies of the current education curriculum.	M SD	4.83 1.33	4.73 1.38	0.63
29. With the advent of tech-prep programs, guidance counselors will require additional training in vocational guidance.	M SD	6.03 1.16	6.05 0.91	0.89
30. Tech-prep programs have integrated vocational and academic curriculum in secondary and postsecondary schools.	M SD	5.28 1.37	5.62 1.01	0.08

* $p < .05$
M = mean   SD = standard deviation
Scale used: 1 = strongly disagree; 2 = disagree; 3 = moderately disagree; 4 = neutral; 5 = moderately agree; 6 = agree; 7 = strongly agree

Table E.4. Mean, standard deviation, and t-prob for each dependent variable by tech-prep teachers and administrators--barriers

Barriers issues		Tech-prep teachers	Administrators	t-prob
31. There is a lack of faculty communication between secondary and postsecondary schools in my school/schools.	M SD	4.50 1.85	4.47 2.00	0.93
32. There is a lack of communication between administrators and teachers within my school/schools.	M SD	3.88 1.87	3.65 1.93	0.46
33. There is a lack of communication between secondary/postsecondary schools and business/industry in my school/schools	M SD	4.47 1.73	4.15 1.83	0.27
34. There is a lack of knowledge for faculty to make changes in my school/schools.	M SD	4.09 1.69	3.96 1.93	0.68
35. There is a lack of funding to buy equipment and materials in my school/schools.	M SD	5.11 1.86	5.33 1.83	0.47
36. There is a lack of teachers' in-service training opportunities regarding tech-prep programs in my school/schools.	M SD	3.93 1.92	4.16 1.97	0.47
37. There is a lack of administrators' in-service training opportunities regarding tech-prep programs in my school/schools.	M SD	3.85 1.69	3.96 1.94	0.71
38. "Turfism" is a problem in implementing a tech-prep programs in my school/ schools.	M SD	4.48 1.80	4.38 2.13	0.75
39. The concept of tracking is a problem to the implementation of tech-prep programs in my school/schools.	M SD	4.31 1.75	3.82 1.84	0.10
40. My administrator/faculty resists the implementation of tech-prep programs in my school/schools.	M SD	2.62 1.53	2.64 1.54	0.95

M = mean SD = standard deviation
Scale used: 1 = strongly disagree; 2 = disagree; 3 moderately disagree; 4 = neutral; 5 = moderately agree; 6 = agree; 7 = strongly agree

Table E.5. Mean, standard deviation, and t-prob for each dependent variable by secondary and postsecondary schools--philosophy

Philosophical issues		Secondary school	Postsecondary school	t-prob
1. Tech-prep programs reduce the dropout rate in high schools better than other programs.	M SD	5.32 1.07	5.31 1.24	0.95
2. Tech-prep programs provide sufficient preparation for employment in the "technological" jobs of the future.	M SD	5.41 1.36	5.29 1.44	0.62
3. Tech-prep programs should be designed primarily for the general education students.	M SD	3.51 1.89	3.53 2.07	0.94
4. Tech-prep programs will prepare students for any level of education.	M SD	5.20 1.71	4.72 1.68	0.11
5. Tech-prep programs can link high school school and community college programs, eliminating "gap" and "overlaps".	M SD	6.39 0.82	6.20 0.79	0.17
6. Teachers and administrators should attend in-service training regarding tech-prep programs to help them communicate with each other.	M SD	6.53 0.68	6.50 0.69	0.80
7. Business/industry should jointly develop and implement tech-prep programs with schools.	M SD	6.51 0.78	6.48 0.72	0.82
8. Tech-prep programs could help meet the employment needs as required by business/industry.	M SD	6.22 0.81	6.22 1.13	0.98
9. It is necessary to establish follow-up programs on graduates of my school for feedback or suggestions to strengthen tech-prep programs.	M SD	6.31 0.85	6.28 0.81	0.85
10. Tech-prep programs should be designed to have flexibility for individual differences of students.	M SD	6.04 1.10	5.98 1.27	0.74

M = mean SD = standard deviation
Scale used: 1 = strongly disagree; 2 = disagree; 3 = moderately disagree; 4 = neutral; 5 = moderately agree; 6 = agree; 7 = strongly agree

Table E.6. Mean, standard deviation, and t-prob for each dependent variable by secondary and postsecondary schools--administration

Administrative issues		Secondary school	Postsecondary school	t-prob
11. Modifications of the existing facilities at my school/schools would be necessary for implementation of tech-prep programs.	M SD	4.24 2.03	3.83 1.78	0.24
12. A tech-prep program would be a good recruiting tool for my school/schools.	M SD	5.73 1.14	5.70 1.07	0.88
13. Teachers/administrators have enough opportunities to attend in-service training related to tech-prep programs in my school/schools.	M SD	4.35 1.93	4.00 1.90	0.24
14. Tech-prep programs are good public relation tools for my school/schools.	M SD	6.00 0.81	5.54 0.96	0.003**
15. My administrator/faculty supports the implementation of tech-prep programs.	M SD	5.88 1.09	5.71 1.06	0.36
16. There is a strong administrative leadership in my school/schools to support the implementation of tech-prep programs.	M SD	5.77 1.27	5.61 1.54	0.50
17. There is appropriate planning to implement tech-prep programs in my school/schools.	M SD	4.81 1.64	5.04 1.66	0.43
18. I am satisfied with the current articulation agreements in my school/schools	M SD	4.93 1.47	4.53 1.78	0.15
19. There are sufficient resources provided within my school/schools to provide tech-prep students personal guidance and counseling services.	M SD	4.26 1.83	4.00 1.45	0.40
20. It is reasonable to let tech-prep students enter, exit, or change programs at any time.	M SD	4.35 1.69	4.00 1.49	0.23

** $p < .01$

M = mean SD = standard deviation

Scale used: 1 = strongly disagree; 2 = disagree; 3 = moderately disagree; 4 = neutral; 5 = moderately agree; 6 = agree; 7 = strongly agree

Table E.7. Mean, standard deviation, and t-prob for each dependent variable by secondary and postsecondary schools--curriculum

Curriculum issues		Secondary school	Postsecondary school	t-prob
21. Tech-prep programs could reduce duplication of courses for the students.	M SD	5.43 1.25	5.60 1.22	0.42
22. The current curriculum of tech-prep programs have reflected real-world applications in both vocational and academic courses in my school/schools.	M SD	5.39 1.23	4.93 1.42	0.048*
23. Tech-prep programs are a good way to prepare youth for their transition from high school to postsecondary institutions.	M SD	6.14 0.94	5.76 1.21	0.06
24. It is necessary to have regular curriculum advisory committees to review, modify or revise my tech-prep curriculum.	M SD	6.02 0.88	6.13 1.05	0.49
25. Tech-prep programs are a good beginning in preparing students for workforce readiness.	M SD	6.44 0.73	6.17 0.80	0.04*
26. Tech-prep programs provide a valuable alternative to college-prep programs.	M SD	6.04 1.36	6.02 1.22	0.92
27. Tech-prep programs could be an improvement over general/academic education programs	M SD	6.44 0.84	6.04 1.13	0.04*
28. Tech-prep programs will overcome the inadequacies of the current education curriculum.	M SD	4.86 1.27	4.64 1.51	0.37
29. With the advent of tech-prep programs, guidance counselors will require additional training in vocational guidance.	M SD	6.10 0.94	5.89 1.37	0.35
30. Tech-prep programs have integrated vocational and academic curriculum in secondary and postsecondary schools.	M SD	5.50 1.20	5.13 1.41	0.10

* $p < .05$
M = mean SD = standard deviation
Scale used: 1 = strongly disagree; 2 = disagree; 3 = moderately disagree; 4 = neutral; 5 = moderately agree; 6 = agree; 7 = strongly agree

Table E.8. Mean, standard deviation, and t-prob for each dependent variable by secondary and postsecondary schools--barriers

Barriers issues		Secondary school	Postsecondary school	t-prob
31. There is a lack of faculty communication between secondary and postsecondary schools in my school/schools.	M SD	4.44 1.88	4.61 1.94	0.62
32. There is a lack of communication between administrators and teachers within my school/schools.	M SD	3.70 1.82	4.07 2.06	0.27
33. There is a lack of communication between secondary/postsecondary schools and business/industry in my school/schools	M SD	4.36 1.65	4.35 2.04	0.96
34. There is a lack of knowledge for faculty to make changes in my school/schools.	M SD	3.87 1.70	4.49 1.90	0.047*
35. There is a lack of funding to buy equipment and materials in my school/schools.	M SD	5.16 1.86	5.17 1.83	0.97
36. There is a lack of teachers' in-service training opportunities regarding tech-prep programs in my school/schools.	M SD	3.97 1.94	4.11 1.94	0.69
37. There is a lack of administrators' in-service training opportunities regarding tech-prep programs in my school/schools.	M SD	3.78 1.83	4.18 1.63	0.20
38. "Turfism" is a problem in implementing a tech-prep programs in my school/ schools.	M SD	4.31 1.90	4.80 1.91	0.15
39. The concept of tracking is a problem to the implementation of tech-prep programs in my school/schools.	M SD	4.13 1.85	4.16 1.64	0.94
40. My administrator/faculty resists the implementation of tech-prep programs in my school/schools.	M SD	2.52 1.54	2.89 1.48	0.17

* $p < .05$
M = mean SD = standard deviation
Scale used: 1 = strongly disagree; 2 = disagree; 3 = moderately disagree; 4 = neutral; 5 = moderately agree; 6 = agree; 7 = strongly agree

APPENDIX F. STATISTICAL TABLE FOR FACTOR ANALYSIS

Table F.1. r-value of the rotated factor pattern for each item

ITEM	FACTOR1 (Administration)	FACTOR2 (Curriculum)
PHILO1	-0.01000	0.58855
PHILO2	0.03848	0.50609
PHILO3	-0.08764	0.06505
PHILO4	0.05420	0.49453
PHILO5	0.18377	0.75942
PHILO6	0.02687	0.49142
PHILO7	-0.00789	0.41243
PHILO8	0.05764	0.52245
PHILO9	0.06375	0.26706
PHILO10	-0.11080	0.31464
ADMIN1	-0.21441	0.01665
ADMIN2	0.06295	0.46093
ADMIN3	0.47835	0.03286
ADMIN4	0.31276	0.60987
ADMIN5	0.61477	0.18896
ADMIN6	0.66094	0.12799
ADMIN7	0.66073	0.08716
ADMIN8	0.62888	0.11730
ADMIN9	0.60996	0.09557
ADMIN10	-0.02410	0.40761
CURR1	0.06288	0.60966
CURR2	0.40745	0.35950
CURR3	0.18477	0.67020
CURR4	-0.01546	0.49714
CURR5	0.10640	0.75876
CURR6	-0.02254	0.42988
CURR7	-0.06409	0.66974
CURR8	-0.10526	0.56846
CURR9	-0.12847	0.39434
CURR10	0.20442	0.43373
BARR1	0.67514	0.08870
BARR2	0.75550	-0.03184
BARR3	0.66559	0.13305
BARR4	0.73789	0.01836
BARR5	0.47641	-0.11467
BARR6	0.67728	0.01614
BARR7	0.74837	-0.02195
BARR8	0.63548	-0.10268
BARR9	0.68703	-0.01931
BARR10	0.57283	0.05957